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ARCHIVES

OF

OTOLOGY

EDITED IN ENGLISH AND GERMAN

BY

DR. H. KNAPP
OF NEW YORK

DR. O. KÖRNER
OF ROSTOCK

DR. A. HARTMANN AND DR. U. PRITCHARD
OF BERLIN OF LONDON

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VOL. XXVI. No. 1.

ARCHIVES OF OTOLOGY.

REPORTS OF OVER SIXTEEN HUNDRED CASES TESTED WITH THE HARTMANN SERIES OF TUNING-FORKS.

By THOMAS J. HARRIS, M.D.,

Assistant Surgeon of the Manhattan Eye and Ear Hospital, New York.

NO subject in connection with diseases of the ear has caused more discussion or study than the question of a proper and accurate method of diagnosis. Aurists, the world over, have been in search of some method and some instrument which would meet all the requirements: The watch, acoumeter of Politzer, the telephone, the human voice, single tuning-forks, all have been successively used, all have merits, and all possess more or less serious failings. To supply, if possible, this much-felt want Dr. Arthur Hartmann of Berlin proposed and suggested, some years ago, the series of tuning-fork tests known under his name. This new method of diagnosis called forth much discussion, and many articles in favor or against have appeared from time to time, but with a single exception, a careful study by Dr. H. A. Alderton of Brooklyn,[1] none have shown any deliberate application of Hartmann's method to a series of cases with a view to adding to the knowledge of this most important subject. The writer has been permitted, through the courtesy of Dr. J. E. H. Nichols, to tabulate the results of some 1650 cases tested by the graded series of forks during the years 1894 and 1895 in his clinic at the Manhattan Eye and Ear Hospital. At the outset it will be well to briefly state what Hartmann claims for this method of examination and how it is applied. In his *Krankheiten des Ohres*, page 33, he asserts that as a result of the studies conducted by him, with the series of forks, four types of ear diseases are to be recognized.

---

[1] ARCH. OF OTOL., vol. xxiii., No. 3, 1894.

Type I. Approximately equal reduction (for all forks) of duration of A. C. occurs as well in middle-ear affections as in labyrinth troubles. In the first instance, good hearing by B. C. is found ; in the second, poor hearing.

Type II. Poor hearing of the low, progressively better hearing of the high tones. By B. C., better hearing than A. C., particularly of the low tones. This condition is found in diseases of the middle ear, sclerotic manifestations, especially with ankylosis of the stapes in the oval window, and in conditions resulting from purulent inflammation of the middle ear.

Type III. Good hearing for low tones, increasing difficulty for the high ones. B. C. reduced, especially for the high forks. This form is found in boiler-makers, gunners, and in affections of the nerve apparatus. In acute middle-ear disease we find not rarely this type, which points to an involvement of the labyrinth by the inflammation.

Type IV. Irregular perception for the different tones, as well by A. C. as by B. C. Under this type are found different forms, poor hearing for the high and low tones with good hearing for the middle, or the middle tones can be perceived poorly and the high and low tones well. B. C. is sometimes increased for individual forks, sometimes diminished, or it can fail altogether. This irregular form of perception occurs in diseases of the nerve apparatus in varying proportion. Often it arises simultaneously with a disease of the conducting apparatus. Especially can a positive diagnosis of labyrinthian disease be made, if certain tones are entirely lacking.

Hartmann at present employs a series of five forks, viz.: c — 128, c^{I} — 256, c^{II} — 512, c^{III} — 1024, c^{IV} — 2048 vibrations. In every set of forks the respective time of duration for the healthy ear must be determined. Among the many objections to the employment of tuning-forks has been that the difference in striking intensity, even in the hands of the same observer, is so considerable, that an accurate result is wellnigh impossible. This is easily answered ; any examiner will in a short time gain such proficiency that his stroke will become virtually uniform. In our own testing the following method was pursued. The patient was always tested in a quiet room removed from all other cases ; the fork was struck with a firm stroke on a suitably padded block, an overtone being carefully avoided. The fork for aërial conduction was placed directly in front of the ear, and for bone conduction pressed firmly on the mastoid ; the free ear was not stopped in any way. A stop-watch was employed, and in order to conduct the test as rapidly as possible, the A. C. was tested, and when the patient signalled cessation of sound, the fork was quickly placed on the mastoid, or *vice versa* as the case might suggest. It stands to reason that children cannot be satisfactorily examined, and that cases will be met where the intellect is of so low order that the result must be doubted. These cases, however, are few, and it has been the experience of the writer that if the patient is informed in advance what is demanded, no trouble will be met, and the results, as a rule, may be regarded as very accurate. In all instances the examinations have been made by men thoroughly competent and under the best of conditions. In conclusion it may be well to recall the following laws by different observers:

I. " By the normal ear all forks are heard longer by air conduction than by bone."—Rinné.

II. " When meatus is artificially occluded in the case of normal hearing the tuning-fork (c^{II}), placed on the median line of the skull, will be heard better in the occluded ear. Therefore in affection of the sound-conducting apparatus the fork will be heard better in the involved ear."—Weber.

III. " In affections of the sound-conducting apparatus, as a result of disease of the external or middle ear, a tuning-fork placed on the skull will be perceived longer than in the normal condition, and, on the other hand, in affection of the sound-perceiving apparatus the perception is shorter than normal."—Schwabach.

IV. " The average upper-tone limit is about indicated by the mark—2.03 Galton whistle. The average lower-tone limit is 17.04 V."—Bezold.

V. "By bone conduction a fork with 32–64 V (c^{-1}-c^{-2}) is often in doubt as regards its perception."—Alderton.

Various methods of graphic representations have been suggested, but the one of Alderton seems most convenient and has been adopted.

	Rinné				
SCHWABACH	A. C.				
	B. C.				
	T. F.	c	c^{I}	c^{III}	c^{IV}

For brevity A. C. = aërial conduction; B. C. = bone conduction. Rinné according to the law A. C. > B. C. being indicated as +; against the law B. C. > A. C. as —. In the squares opposite Schwabach the duration in seconds of each fork is indicated, both A. C. and B. C.

With these necessary preliminary explanations we will proceed to the subject-matter of this paper.

The first step necessary in our observations was to determine a standard time limit for one set of forks. An interesting fact developed in this connection was the rarity of normal hearing among those who regarded their hearing as perfect and who had never had any complaint. After many failures in this respect we finally succeeded, through the kindness of Captain Kendall, Surgeon U. S. A., in finding twenty-five soldiers at Governor's Island who gave normal hearing; watch $\frac{80}{80}$, whispered voice 20 feet.

	Rinné	+	+	+	+	+
SCHWABACH	A. C.	38	19	65	31	20
	B. C.	16	8	24	13	12
	T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

In an analysis of the cases studied the usual grouping according to diagnosis has been pursued—viz., cases of

Impacted cerumen.
Diseases of auditory canal.
Middle ear, acute.
Middle ear, chronic. { simple. adhesive, sclerotic.
Internal ear.
Mixed (middle ear and internal ear).

Tests of cases with adenoid growths and of Eustachian tube catarrh were unfortunately omitted.

Many questions naturally suggest themselves in the examination of so large a collection of tested cases, among them the truth of the Rinné law which has been so often disputed, the correctness of the Schwabach observation, the value of employing a series of forks as suggested by Hartmann to determine a diagnosis and especially the accuracy of his second and third laws.

Group A. The first group of cases studied was those of impacted cerumen. No attempt was made to determine the condition of the middle ear, but it is a well known clinical observation that many cases of impacted cerumen show more or less involvement. Although most of these cases showed decided improvement after removal of cerumen, no accurate subsequent test was possible in most cases.

105 cases of impacted cerumen.

	Rinné	–	+	+	+	+
SCHWABACH.	A. C.	13	10	22	12½	7¾
	B. C.	13¾	8	15	9	4
	T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

32	52	33	40	40
90	101	60	75	32
c	c^{I}	c^{II}	c^{III}	c^{IV}

These agree with a series of 96 cases tested by Alderton, as far as the lower forks are concerned; in the two higher forks, however, this series shows a reduction of nearly 50 per cent. for A. C. and B. C. over that of Alderton.

It will be noticed from the percentage table, that the reduction for the different forks is nearly uniform by A. C., but by B. C. there is a decided falling off as the higher forks are reached. In none of the 105 cases was any labyrinthine involvement suggested, or symptoms given. We are then compelled to look elsewhere for an explanation, for allowing a few to have been thus complicated, it is fair to exclude this element as affecting the entire series. This, we believe, is found in what will be later alluded to, viz., the intimate relation of the middle and internal ears, and that even in cases involving primarily the auditory canal alone, both middle and internal ear are in time made to suffer.

Group B. Twenty cases of otitis externa circumscripta.

	Rinné	+	+	+	+	+
SCHWABACH.	A. C.	21	15	25	18	8½
	B. C.	17	11½	19	12	3½
	T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

53	79	37	58	42
106	143	81	90	28
c	c^{I}	c^{II}	c^{III}	c^{IV}

The findings here are, in the main, similar to those of Group A, as would be expected. The reduction by A. C. is uniform, save in the case of the middle fork, which is surprisingly low. B. C. is increased above normal for the lower forks, but, as in Group A, falls off as the scale is ascended, c^{IV} being unexpectedly low.

Group C. (*a*) Otitis media catarrhalis acuta. 35 cases.

	Rinné	+	=	+	+	+
SCHWABACH.	A. C.	15	10	20	9½	8
	B. C.	14	10	15	8	3½
	T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

37	52	32	30	40
87	125	62	60	24
c	c^{I}	c^{II}	c^{III}	c^{IV}

(*b*) Otitis media suppurativa acuta. 37 cases.

	Rinné	+	=	+	+	+
SCHWABACH.	A. C.	7	10½	24	12	6
	B. C.	15½	10¾	18¾	9	4
	T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

17	55	36	39	40
97	133	78	76	33
c	c^{I}	c^{II}	c^{III}	c^{IV}

(*c*) Acute inflammation of attic. 10 cases.

	Rinné	+	+	+	+	+
SCHWABACH.	A, C.	23	14	28	14½	9½
	B. C.	17½	9	19	7	6
	T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}.

Percentage.

58	73	42	45	47
109	112	81	52	50
c	c^{I}	c^{II}	c^{III}	c^{IV}

A study of these three tables is of value as showing, first, that A. C. is diminished almost uniformly for all forks in each condition except in (c) where the severity of the inflammation has especially affected the low c fork; secondly, that Bezold's statement is true, that in acute affection of the middle ear there is with diminished hearing still a positive, if abbreviated, Rinné, for in all instances positive Rinné is preserved save in the one just referred to; thirdly, that Alderton's statement that an affection of the sound-conducting apparatus increases the duration for bone conduction except for the highest note, is not maintained, for in each case save with the c fork, B. C. is diminished, and especially for the higher forks. It would seem from this as if in all acute inflammation of the middle ear, the sound-perceiving apparatus was also considerably involved.

Group D. Otitis media sub-acuta. 41 cases.

	Rinné	+	+	+	+	+
SCHWABACH	A. C.	16	13	26	16	8
	B. C.	15	10⅔	17	9	5
	T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

40	73	38	52	43
94	133	71	67	40
c	c^{I}	c^{II}	c^{III}	c^{IV}

This group is to be compared with Group C, to which it might be joined. It will be seen that both A. C. and B. C. are better as compared with (*a*) (otitis media catarrhalis acuta) showing that the intensity of the inflammation is not so severe, and that while the labyrinth is here also involved, it is to a less extent. Bezold's observation of a positive Rinné in this class of disease is again confirmed. Finally it will be noticed from the per cent. column, which is the true index of results, that high and low notes suffer almost equally by A. C., though the high notes as in Group C are the greater sufferers by B. C.

Group E. I. Otitis media chronica suppurativa. 222 cases.

	Rinné	—	—	=	=	+
SCHWABACH	A. C.	10	8	17⅓	10⅔	7
	B. C.	17	10⅓	17⅔	10⅔	4
	T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

24	41	23	32	35
106	127	23	32	33
c	c^{I}	c^{II}	c^{III}	c^{IV}

These have been divided into two divisions for study according to the degree of hearing involved. EXCESSIVE, representing those cases which did not hear the whispered voice at ten feet. MODERATE, all others.

(b) Excessive (whisper under ten feet).

Rinné.	—	—	—	—	+
A. C.	8	6¼	16	7¾	6
B. C.	11	10	17¾	9	3¾
T. F.	c	c^I	c^{II}	c^{III}	c^{IV}

Percentage.

20	34	25	25	30
69	125	74	69	30
c	c^I	c^{II}	c^{III}	c^{IV}

(a) Moderate (whisper over ten feet).

Rinné	—	+	+	+	+
A. C.	12¾	11	20	17¼	10
B. C.	15¼	10¾	16¾	15	3
T. F.	c	c^I	c^{II}	c^{III}	c^{IV}

Percentage.

31	58	30	56	50
95	135	67	117	40
c	c^I	c^{II}	c^{III}	c^{IV}

II. Otitis media suppurativa residuosa. 55 cases.

Under this are classed those cicatricial conditions of the tympanum, the result of purulent inflammation.

	Rinné	—	—	—	—	+
SCHWABACH	A. C.	8¾	7¼	15	9	7
	B. C.	17	11	16	9¾	3
	T. F.	c	c^I	c^{II}	c^{III}	c^{IV}

Percentage.

21	39	22	29	35
106	137	66	71	24
c	c^I	c^{II}	c^{III}	c^{IV}

III. Otitis media chronica sclerotica. 11 cases.

This class is made up of cases where inspection of drum membrane and other signs reveal a dry catarrh of the tympanum cavity with anchylosis of the stapes.

Rinné	–	=	+	–	+
A. C.	8	6	13⅔	6	6
B. C.	12½	6⅓	8	7½	3
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

20	31	20	19	18
78	81	33	55	25
c	c^{I}	c^{II}	c^{III}	c^{IV}

This is one of the most instructive of the groups under observation, for here we are supposed to meet typical affections of the sound-conducting apparatus. A brief inspection will show that the second law of Hartmann is at least in the main confirmed. Both (a) and (b) show poorer hearing by A. C. for c than for c^{IV}, and there is, as Hartmann affirms, "by B. C. better hearing than by A. C., particularly of the low tones."

But what is not confirmed, is the progressive improvement by A. C. as the scale is ascended. Table (a) shows c and c^{II} equal, also c and c^{III}, while table (b) makes c and c^{III} equal, and c possess the longest duration in the series. Here it may be well to remark that the c fork has proved itself most erratic in its registration, and its value has not commended itself. Table II. is similar in its bendings with (a) and (b). Rinné is negative for all save the highest forks, and in the two lower forks B. C. is actually lengthened above normal. It will be noted, however, that in the three higher forks B. C. suffers in the highest fork more than A. C. When we come now to Table III. (otitis media chronica sclerotica), we perceive that the Hartmann law is not maintained. B. C., it is true, is relatively in excess of A. C., though actually diminished for the entire series compared with the normal. A. C. shows, however, an almost uniform lowering for all forks, the highest forks as a fact being slightly more involved than the lowest. This form of disease of the sound-conducting apparatus has assumed vastly greater significance from a diagnostic point, in the last few years. The small number of the cases tested precludes making any positive deduction, but it would seem from our knowledge of the *site* of the trouble—*i. e.*, in a large degree in the stapes, and its attachment to the oval window, that sclerosis of the middle ear is not limited to this region alone, but extends into the inner ear and involves the sound-perceiving apparatus as well.

Group F. Otitis media catarrhalis chronica. 428 cases.

The result of the tests in these cases is given collectively. The cases have then been divided for purposes of more close study according to degree of impairment of hearing, and the result recorded.

Table A. O. M. C. C. 428 cases.

Rinné	–	–	+	+	+
A. C.	10	7½	18	11	9¾
B. C.	15½	10½	16⅔	9½	4
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

25	39	27	37	49
97	131	71	71	32
c	c^{I}	c^{II}	c^{III}	c^{IV}

Table B. O. M. C. C. Moderate (hearing over 10 feet). 145 cases.

Rinné	+	+	+	+	+
A. C.	14½	13	22	18	9
B. C.	13½	10	15	16	4
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

36	68	33	40	47
84	120	62	124	33
c	c^{I}	c^{II}	c^{III}	c^{IV}

Table C. O. M. C. C. Considerable (hearing under 10 feet and more than 2 feet). 122 cases.

Rinné	−	−	+	=	+
A. C.	11⅓	4¾	21	10¾	8
B. C.	15¾	11¾	17	10	4⅓
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.				
29	25	32	55	40
98	147	71	80	36
c^{I}	c^{II}	c^{II}	c^{III}	c^{IV}

Table D. O. M. C. C. Excessive (hearing under 2 feet). 161 cases.

Rinné	−	−	−	−	+
A. C.	4⅓	4	13	4	6
B. C.	19	10	17	9	3
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.				
11	21	20	13	31
119	120	81	71	24
c	c^{I}	c^{II}	c^{III}	c^{IV}

Under this heading is the largest number of cases. A careful examination of the table is in order. It will be seen in the first place that A. C. in all the tables is decidedly less for the low c fork than for the high c^{IV} fork. Rinné is changed from positive in Table B to negative in Table C for all but the highest forks. B. C., with the exception of the c^{II}, which, it is to be remarked, is ever out of harmony in its recordings, is greatly lengthened relatively but not absolutely. Table A, omitting the result in case of c^{II}, shows a marked reduction in the highest fork, while the low c fork is slightly below normal. As the degree of deafness increases, B. C. is seen to also increase until in Table D for the low fork there is an actual increase in tone duration. For the three higher forks, however, this is not true. Indeed the highest fork suffers markedly, being lowered 76 %. Schwabach's observation that in this condition there is an increase in B. C. is seen not to be confirmed. At best it can be said that for low-toned forks B. C. remains unimpaired. For the higher forks it is affected, though not to the same extent as A. C., save in the high c^{IV} fork, where it will be seen that in each case A. C. remains greater than B. C. Hartmann's statement, that in otitis media chronica catarrhalis the entire series of forks by A. C. is diminished equally, also becomes faulty, for in every instance, as just noted, the low fork is emphatically the greater sufferer. There is a slight advance as the scale is ascended in every instance, but so slight that it cannot be regarded of any value. It can be fairly said that c, c^{I}, c^{II}, c^{III}, are equally lowered, and that the chief divergence arises only when the c^{IV} is reached. No additional significance or data are then gained by the use of the three intervening forks, and these may, to save time, be well omitted.

Group G. Otitis interna. 188 cases.

These have been arranged for study also in four tables: first, collectively, and then according to the degree of loss of hearing.

Table A. O. I. 188 cases.

Rinné	+	+	+	+	+
A. C.	17⅓	9	23	10	5⅔
B. C.	9⅔	5	9	4⅓	2
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

43	47	33	33	28
60	64	37	33	16
c	c^{I}	c^{II}	c^{III}	c^{IV}

Table B. O. I. Moderate (over 10 feet). 60 cases.

Rinné	+	+	+	+	+
A. C.	26⅓	15	31	15	7
B. C.	11	6	13	6	3
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

66	93	49	50	35
69	75	54	46	25
c	c^{I}	c^{II}	c^{III}	c^{IV}

Table c. O. I. Considerable (under 10 feet, more than 2 feet). 37 cases.

Rinné	+	+	+	+	+		Percentage.				
A. C.	17½	14	29	16	7		45	73	45	42	35
B. C.	12	6	10	5	3		75	51	41	41	25
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}		c	c^{I}	c^{II}	c^{III}	c^{IV}

Table D. O. I. Great (less than 2 feet). 91 cases.

Rinné	+	−	+	=	−		Percentage.				
A. C.	10½	2	15	3½	4		25	11	22	10	20
B. C.	8½	3½	6	3	1		52	50	25	22	7
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}		c	c^{I}	c^{II}	c^{III}	c^{IV}

It will be observed from an inspection of these tables that the general law, that in diseases of the internal ear the high forks are more affected, is maintained. Hartmann's assertion, that the improvement is progressive as the scale is descended, is, however, only in part found to be true. In all instances, the middle c^{II} fork suffers less than the high c^{IV}, and more than low c, but, save in Table D, it is virtually affected in like degree with c^{III}. The c^{I} fork continues to exhibit the same irregular response in every instance save in Table D, showing less involvement than low c.

As a whole, B. C. may be said to suffer in equal degree for the higher notes. For the lower forks it shows less involvement. Rinné is almost uniformly maintained positive. In each instance it is shown that for the highest forks B. C. is by far the greater sufferer. This is especially true in cases of great loss of hearing (Table D). What applies to Rinné being positive in that table, is found out in an actual examination of the individual cases, as is shown by the following:

Group H. Otitis interna.

Rinné		+	−	=	Percentage +	Percentage −	Percentage =
Cases of otitis interna. Moderate degree.	c	52	8	0	87	13	0
	c^{II}	60	0	0	100	0	0
	c^{IV}	60	0	0	100	0	0

Rinné		+	−	=	Percentage +	Percentage −	Percentage =
Cases of otitis interna. Considerable degree of involvement.	c	28	6	2	77	25	8
	c^{II}	37	1	0	96	4	0
	c^{IV}	37	0	0	100	0	0

Rinné		+	−	=	Percentage +	Percentage −	Percentage =
Cases of otitis interna. Great loss of hearing.	c	59	27	13	63	33	4
	c^{II}	74	11	6	87	9	4
	c^{IV}	67	3	19	96	4	0

Ten of these 13 cases give no response for A. C. or B. C. If they are therefore excluded in the percentage column, Rinné will be positive in 63 % instead of 55 %. This is also true of 17 of the 19 cases reported under c^{IV}

Rinné		+	−	=	Percentage		
Otitis interna. All degrees of hearing. 189 cases	c	130	41	15	75	21	4
	c^{II}	170	12	6	90	2	8
	c^{IV}	164	3	3	92	4	4

In this connection it may not be amiss to state the result of the 430 cases of otitis media catarrhalis chronica as regards Rinné. This is a subject which has been repeatedly studied in the past; this report is only of value then as confirming or disproving previous observations. The following tables will show the result for the three different divisions of cases as well as for the entire number.

Group I.

(*a*)

Rinné		+	−	=	Percentage		
Cases of moderate degree of involvement of hearing.	c	77	56	9	54	40	6
	c^{II}	107	31	5	77	20	3
	c^{IV}	124	3	13	77	21	10

(*b*)

Rinné		+	−	=	Percentage		
Cases of considerable degree of involvement.	c	36	83	7	28	66	5
	c^{II}	65	57	6	48	47	5
	c^{IV}	102	15	12	80	11	9

(*c*)

Rinné		+	−	=
Cases of great loss of hearing.	c	17	137	4
	c^{II}	43	112	4
	c^{IV}	114	20	27

Percentage

11	87	20
27	70	3
81	12	17

(*d*)

Rinné		+	−	=
All cases collectively.	c	130	276	20
	c^{II}	215	200	15
	c^{IV}	338	38	52

Percentage

30	66	4
50	46	8
79	9	12

A brief comparison of these tables will show the accuracy of observations previously made by Politzer and more or less well recognized, namely, the Rinné experiment is at the most of doubtful value in cases of moderate involvement of hearing. The results actually showed a positive Rinné in a majority of cases. This holds true of cases of considerable loss of hearing (voice less than 10 feet), where the positive and negative Rinné is virtually equal. Only for cases of great loss of hearing are there a decided response in favor of the Rinné law. Although the investigation has been made for three forks, in our judgment the middle c is the only satisfactory one to be used. All through the different tables, c^{IV} remains surprisingly positive in its registration, while low c, as Politzer observes, is liable to error by its tone being confused with sensation. We are justified in concluding that in all, save cases of marked loss of hearing, the value of Rinné for purposes of diagnosis is not sustained. Referring back to Group H, which gives the results in diseases of the internal ear, we see there is here a decided and actual declaration in favor of positive Rinné for all degrees of hearing. This is of value to a certain extent, yet the 77 % and 48 % of positive Rinné in (*a*) and (*b*) of O. M. C. C. force us to conclude that we are not warranted in inferring that, because we have positive Rinné in a given case, disease of the middle ear is excluded in our diagnosis and we are dealing with involvement of the labyrinth.

Group J. This group comprises the so-called cases of mixed diseases—cases showing, from the symptoms and examination, involvement of both sound-perceiving and sound-conducting apparatus. This group is surprisingly large, as our more accurate knowledge teaches us that such involvement is by no means as uncommon as was formerly supposed. The same subdivision has been followed as in the preceding group.

Table A. Mixed diseases. 276 cases.

Rinné	−	=	+	+	+
A. C.	8½	7	14½	7	6
B. C.	10½	7	9½	4	2½
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

21	37	21	23	30
65	88	39	52	20
c	c^{I}	c^{II}	c^{III}	c^{IV}

Table B. Mixed diseases. Moderate (voice over 10 feet). 56 cases.

Rinné	+	+	+	+	+
A. C.	11½	12	19½	15	5⅔
B. C.	8⅔	8	9	6	3
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

25	63	29	49	29
55	100	37	46	23
c	c^{I}	c^{II}	c^{III}	c^{IV}

Table C. Mixed diseases. Considerable (voice less than 10 feet, over 2 feet). 60 cases.

Rinné	=	+	+	−	+
A. C.	10	8	16	3½	5½
B. C.	9½	5	10½	5	3½
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

25	42	25	115	28
59	62	46	39	28

Table D. Mixed diseases. Great (voice under 2 feet). 160 cases.

Rinné	−	−	+	+	+
A. C.	6½	4½	12½	5	2½
B. C.	11	7½	9	3	1
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

16	24	20	16	13
69	99	37	23	8
c	c^{I}	c^{II}	c^{III}	c^{IV}

Inspection of the tables in the groups shows an approximately equal involvement of each fork by A. C.; B. C. remains about as in the cases of internal ear disease, lowered throughout, but chiefly for the high notes.

We finally present, as of possible interest, 18 cases of presbyacousis which Roosa has defined to be an atrophic condition of the tympanic muscles coincident with a similar lesion of the acoustic terminal filaments.

Group K. Presbyacousis. 18 cases.

Rinné	+	=	+	+	+
A. C.	$13\frac{1}{3}$	6	20	$9\frac{2}{3}$	$6\frac{1}{3}$
B. C.	$6\frac{2}{3}$	$6\frac{1}{3}$	9	3	3
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

33	31	31	31	33
41	79	37	23	24
c	c^{I}	c^{II}	c^{III}	c^{IV}

While most of the cases examined have been easy to classify, symptoms, objective examination, and fork reactions agreeing, a certain number presented anomalies and seemed to be contrary to all laws. We give a few of these:

CASE 28.—J. O., age 27. Left ear: *Mt* sunken and opaque; no complaint. Watch, $\frac{0}{80}$ inches; whisper, 24 inches.

Rinné	+	+	−	−	=
A. C.	20	15	15	3	3
B. C.	10	5	20	10	3
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

50	75	25	10	17
66	63	80	24	25
c	c^{I}	c^{II}	c^{III}	c^{IV}

CASE 108.—Complains of tinnitus 8 years. Voice, 30 feet. Age 41. *Mt* retracted; light spot lost; posterior fold.

Rinné	+	+	+	+	+
A. C.	34	24	28	22	12
B. C.	22	7	24	10	7
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

85	126	42	71	60
147	87	100	74	56
c	c^{I}	c^{II}	c^{III}	c^{IV}

CASE 146.—Age 10. "Hard hearing two weeks." Right ear: *Mt* retracted; also malleus.

Rinné	–	–	=	–	–
A. C.	10	15	30	7	5
B. C.	15	30	30	15	6
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

25	79	45	23	25
94	360	125	114	50
c	c^{I}	c^{II}	c^{III}	c^{IV}

CASE 182.—J. W., age 35. Hard of hearing five years. Right ear: *Mt* thickened and retracted.

Rinné	–	–	–	+	=
A. C.	8	7	25	8	0
B. C.	25	12	32	4	0
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

20	37	39	26	0
156	150	136	33	0
c	c^{I}	c^{II}	c^{III}	c^{IV}

CASE 111.—F. F., age 26. Tinnitus three months. Hearing normal. Handle malleus congested; *Mt* otherwise normal.

Rinné	+	+	+	+	+
A. C.	10	12	10	25	10
B. C.	5	7	8	5	0
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

25	63	15	81	50
33	88	33	38	0
c	c^{I}	c^{II}	c^{III}	c^{IV}

CASE 281.—E. W., age 11. Hard of hearing seven years. No history of sickness. No discharge from ear. Child healthy; birth normal. Voice, six inches. *Mt* normal.

Rinné	+	+	+	+	+
A. C.	25	13	25	8	4
B. C.	14	5	5	0	0
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

63	69	39	25	25
87	62	21	0	0
c	c^{I}	c^{II}	c^{III}	c^{IV}

CASE 548.—C. S., age 17. Complains of pain, one day in left ear. No pain in right, but voice only six inches. *Mt* normal.

Rinné	+	+	+	+	+
A. C.	30	15	55	20	12
B. C.	27	8	24	10	7
T. F.	c	c^{I}	c^{II}	c^{III}	c^{IV}

Percentage.

75	79	93	65	60
169	100	100	76	60
c	c^{I}	c^{II}	c^{III}	c^{IV}

These seven cases are alike in that they give absolutely no symptoms or history of internal-ear disease, and all show, except Case 111, the low c fork less disturbed by A. C. than c^{IV}. They fall into two groups, according to the response for B. C. Cases 28 and 281 are similar in having, in connection with the greater reduction of c^{IV} and low c, a decided lowering of all the forks by B. C., especially the higher. Case 28 presents well-defined changes in the drum membrane. Case 281 showed no change.

Cases 108, 146, 182 differ from these cases only in that there is marked prolongation of B. C. for all the three lower forks. The *Mt* shows in each instance characteristic changes. Case 548 is similar to these, save all changes in *Mt* are lacking.

With these statements what conclusions are to be drawn? Although Cases 28 and 281 present reactions suggesting strongly internal-ear diseases, there is nothing in the history to justify this diagnosis. Case 281 especially has been under observation a long time, and does not give a suspicion of involvement of the internal ear by any condition usually supposed to cause it. While we do not care to commit ourselves positively, we are strongly of the opinion that each case properly should be classed under the title of mixed diseases. The four cases which show preserved B. C. are those of relatively slight involvement of labyrinth, B. C. remaining lengthened, as it should be in O. M. C. C., according to Schwabach's law, while in Cases 28 and 281 we have more advanced conditions shown in the diminished B. C.

We are decided in our convictions that they all illustrate what to us is an important observation first made by Steinbruegge, viz., that our present arbitrary division of ear diseases into that of the middle and those of the internal ear cannot hold, but that in many or most cases of middle-ear disease, the relation of the internal to the middle ear is so intimate that the former shares to a greater or less extent. Further, that the involvement may vary, the middle-ear disease at times being more active, and at times that of the internal ear.

Case 111 is hardest of all to understand satisfactorily. Here is a decided lowering of B. C., with c much more affected than c^{iv} by A. C., and yet a negative appearance of the *Mt* and hearing normal. We feel that here we would not be warranted in diagnosing any organic disease of the middle and internal ears. More probably the condition is one of Eustachian-tube catarrh, the extent of which in its effect on the sound-conducting and receiving apparatus is not fully appreciated.

The question of prognosis is always an important one, especially in cases of chronic catarrhal diseases of the middle ear; our patients very naturally demand to know what hope they may entertain of improvement or recovery under treatment. This question we are at present studying from the standpoint of the tuning-fork. We are not yet warranted in drawing any positive conclusion,—the number of cases examined is too small,—yet we believe our results justify their being reported. Forty-five cases of O. M. C. C. were tested at time of first visit, and then the tests were repeated at a subsequent visit after Politzerization, 30 of these on or near the second visit, 15 sometime after a month's treatment. The results in hearing were carefully noted at completion of treatment. Of these, 24 showed improvement in fork reaction and presented improvement in hearing at close of treatment; 18 showed no improvement in fork reaction and no improvement in hearing; 2 showed no improvement in fork reaction but improvement in hearing. Here is seen a practical unanimity in showing a correspondence between forks and hearing. How far this can be carried, we are not prepared to say. For instance, what inference should be put on an improvement for only a part of the forks or for A. C. but not B. C. also, whether we can say that the improvement in hearing will be in direct proportion to the gain in fork reaction. These are points which can only be cleared up by further tests in this direction.

CONCLUSIONS.

I. Normal hearing, as shown by watch, voice, and tuning-forks, is by no means as common as has been supposed. This failure is either apparent or real. It can with reason be affirmed that each person is a standard to himself and is not to be compared with some one else. A more rational explanation lies in the fact that in our climate catarrhal disease, the great cause of ear trouble, has insidiously exerted its effect on Eustachian tube and middle ear.

II. Acute affections of the sound-conducting apparatus, including obstruction to hearing by impacted cerumen, cause involvement of the entire musical scale by A. C. B. C. is likewise affected for the higher tones. This is suggestive that the labyrinth shares secondarily in the inflammation.

III. Chronic suppurative diseases of the middle ear cause reduction in the entire scale for A. C., mostly for the low forks, least for the high forks. Hartmann's 2d law is therefore true to this extent; progressive degree of loss of hearing as the scale is descended, is not true.

IV. Chronic catarrhal conditions of the middle ear are similar to suppurative disease in their result on A. C., the low fork suffering always greatly more than the high fork. Hartmann's 1st law is accordingly shown to be incorrect.

V. Diseases of the internal ear show that the high fork suffers more than the low fork by A. C. Hartmann's 3d law is therefore correct to this extent.

VI. The result does not warrant the employment of the Hartmann scale for purposes of diagnosis. No progressive scale can be maintained. The low and high forks will give us all the information we desire.

VII. Rinné, except in cases of excessive poor hearing, is of doubtful value in diseases of the middle ear; the results being often conflicting.

VIII. The series of tuning-forks is of value in prognosis to an extent not determined.

IX. There exists a large class of cases which conform to none of the regular types of disease as revealed by the tuning-forks, and can only be regarded as falling under the head of mixed disease.

In conclusion, the writer desires to express his indebtedness to Dr. J. E. H. Nichols for valuable assistance, and to the aid and suggestions derived from the paper of Dr. H. A. Alderton, already referred to.

A CASE OF SECONDARY CHOLESTEATOMA OF THE ANTRUM AND MASTOID REGION.

By Dr. ROBERT SATTLER, Cincinnati, O.

A PRIMARY cholesteatoma[1] of the temporal bone unattended or preceded by inflammatory disturbances either on the part of drum, middle ear, or adjacent cavities is a rare neoplasm.

Slowly but inflexibly, though years may elapse before this comes about, it pushes its destructive work until external or internal perforation of the bone results, followed speedily by death.

Only during the later stages of its growth are pain, tinnitus, and evidences of central disturbance conspicuous symptoms; during the early stages its course is wholly a latent one.

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[1] Cruveilhier, as is well known, first selected the name cholesteatoma for a neoplasm which he found in the covering membranes of the brain. Virchow and others have described under the name mother-of-pearl tumor, or margaritoma, a similar neoplasm. In Schwartze's *Handbuch der Ohrenheilkunde*, Band ii., page 603, Kuhn refers to the cases of primary cholesteatoma of the temporal bone reported by Lucae, Panse, Wendt, Schwartze, Urbantschitsch, and others.

Four years ago a physician from Central Kentucky brought his sister, a woman aged fifty, to me, with the statement that she had a growth in the left ear. She had been aware of defective hearing in the left ear for several years. This during the last few months increased rapidly, and annoying tinnitus and vertigo were added; recently the meatus became occluded and a hard white mass could be seen.

On examination the left auditory canal was occluded by a firm shining mass. There was no discharge and no odor, nor had she at any time noticed either. Hearing was totally abolished. The pain was intense and was referred to the entire side of the head. The patient suffered so severely that after consultation she decided to return to her home. Several days after her visit to me she died amidst symptoms suggesting internal perforation of the growth. A post-mortem was, unfortunately, not made.

More common than this infrequent primary growth, is the so-called secondary cholesteatoma.

This new formation attacks with preference the same localities, *i. e.*, epi-tympanic cavity, mastoid antrum and cells.[1] It manifests a similar slow and latent course during the early stage of its growth, and later is attended by the same dangerous sequences from pressure, erosion, bone absorption, and perforation. It differs, however, from true or primary cholesteatoma in that it is associated with and dependent upon chronic purulent lesions of the middle ear, accompanied by a low grade of inflammatory activity. It is probable that it owes its immediate origin to the implantation of epidermoid tissues from the membrana tympani and adjacent cutaneous areas of the auditory canal. These are transported, by various channels, into remote and hidden recesses of the neighboring pneumatic bone cavities, and there become incarcerated and subsequently undergo desquamation and desiccation. A delicate capsule, intimately adherent to the bone, surrounds the new growth, which is composed of firmly compressed concentric lamellations of steatomatous masses, interspersed with granular fat and cholesterine crystals.

This new formation, or secondary cholesteatoma, must again be distinguished from the cholesteatomatous masses which are found in almost every case of chronic purulent middle-ear disease in which it becomes necessary to expose the seat of the lesion for inspection and surgical treatment. These formations are also made up of closely packed, softened, and partially dried epidermis cells, arranged in lamellæ around masses of inspissated pus or horny cells. An enveloping capsule, however, is not present, and the characteristic metallic reflection is also absent. Cholesterine crystals are found, but in much lesser quantity than in the true primary and secondary neoplastic formations.

Among a series of consecutive operations undertaken for the relief of grave chronic complications of middle-ear disease I have recently met with a typical example of a large secondary cholesteatoma of the mastoid cells and antrum.

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[1] Von Troeltsch, Wendt, Habermann, and Bezold have all suggested explanations for the probable origin of this new formation. The views of Haberman and Bezold have found a more general acceptance, and the case here reported and two others, in which the new formation was in the epi-tympanic cavity and antrum, afford additional evidence that this explanation is a most rational one.

Miss A. G., æt. seventeen; Franklin Co., O. Had repeated attacks of acute otitis media during infancy. At the age of two years she had a more violent attack, which was complicated with acute periostitis of the mastoid on the left side. An incision was made and pus was evacuated. From that time on, discharge from both ears continued until she was brought to me about seven years ago. At that time a fetid purulent discharge with large perforation of the membrana tympani, granulations, caries of the ossicles, and reduced hearing power of both ears were found. Under treatment she improved and in right ear she was so much benefited by use of cotton drum that she attended school without interruption. The hearing of the left ear was hopelessly reduced and not improved by artificial aid. The fetid discharge continued but during the last two years it became less and less and for months had entirely ceased.

After an absence of several years I re-examined her in *the fall of 1896.* The hearing power of the right ear with artificial drum was excellent, and there was no evidence of a progressive erosive disease. In the left ear, hearing was found almost abolished, but no discharge. On exploring the middle ear with probe and cotton-holder, a fetid odor, but no discharge, was detected. A few scales of desquamated epidermis were removed, but there was no evidence, other than the fetor, of a cholesteatoma in the middle ear or epi-tympanic cavity.

She complained of distress, not pain, which was almost constant over the entire left side of the head, but it was not localized or referred to the mastoid region. Firm pressure over the mastoid caused pain. It was also noticed that if firm pressure against the region was made, a distinct yielding of the outer bony wall could be felt.

This discovery led me to suspect an erosive lesion of the antrum and cells and radical surgery was at once advised. Several days afterwards the operation was performed.

The periosteum was adherent in places and much thickened. The first few chips of bone which were removed, disclosed to us a very thin cortex and then a glistening structure which at first was mistaken for an anomalous course of the sinus, but which we subsequently found to be the capsule of a new growth.

A large oval opening, thoroughly exposing the growth which was now unmistakable, was made into the cortex and layer upon layer of thickened, partially dried, glistening white, shrivelled epidermoid tissue, interspersed with numerous discs of cholesterine, etc., were removed. Fearing lest similar masses might be retained or hidden in the attic and other recesses of the middle ear, these cavities were thoroughly exposed for inspection by complete removal of the lateral wall of the middle ear and posterior wall of the meatus and this whole region transformed into one large cavity.

No reaction or other untoward symptom came about during the following weeks and the recovery was uneventful. The external opening was maintained for better inspection and to anticipate any recurrence of the growth.

The growth had hollowed out the region of the mastoid cells and antrum so that a cavity as large or larger than an English walnut had taken their place. Firmly packed within this cavity, surrounded by a thin glistening capsule which was intimately adherent to the bone, was the new formation, a firmly packed and concentrically lamellated structure with the characteristic polished lead or metallic-lustre appearance. The capsule once broken and pressure, by removal of the outer bony wall, relieved, its own inherent elasticity caused expansion and partial extrusion of the growth, through the opening in the bone, and layer upon layer of white shrivelled and partially desiccated scales with quantities of bright cholesterine plates was removed.

The adhesion of the thin capsule to the bone, which presented numerous smaller excavations in addition to the central or larger one, was a very intimate one. The posterior and lateral walls of the space excavated by the growth were so thin that pulsation of the dura was distinctly visible. The removal of the capsule and curetting were done as thoroughly as possible, even in localities where the dura was bare or exposed, in order to destroy the growth effectually.

This case affords another apt illustration of the insidious course and erosive tendency of this treacherous new-formation of the temporal bone.

FOUR CASES OF OTITIS MEDIA PURULENTA, WITH EXTENSION INTO THE SKULL AND THE BACK OF THE NECK.

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THERE is nothing unusual about cases of otitis media unless they lead to complications of the surrounding parts of the head, and these four cases are contributed as a mite to the testimony concerning the variety of complications which may result from a simple discharging ear. Volumes have been written in recent years on the subject, and yet even when commanding a fair knowledge of the latter, one is constantly confronted by cases which are puzzling, and where no previous data exist to exactly match or make clear an existing difficult problem. It is the question concerning operation where we are most frequently put to a test, and he is a bold man who even in these latter days can in every such case of complication give an absolute opinion as to whether operation is, or is not advisable. These cases are somewhat illustrative of this very point, and are each of them peculiar.

CASE I.—**Epidural Abscess in the Middle Cranial Fossa.**

On June 20, 1896, I was consulted by a young man, twenty-two years old; metal worker. In April, 1896, following a severe cold, he had pain in his *left* ear, and in the course of two days the drum broke and the ear discharged from ten to fifteen days; during the latter part of the time that this ear discharged, the *right* became affected in a similar way, and broke,—however, after four or five days of pain instead of forty-eight hours, as was the case in the other ear. He had pain for a number of weeks afterward, and the discharge has continued up to the present time. For three weeks past he has had pain and some swelling and tenderness behind and above the right ear, and for the last few days had the drowsiness, discomfort, fever, furred tongue, soft and rapid pulse, clouded mentality, usually indicative of brain pressure, to which in the last two days have been added chilly sensations and considerable increase in the headache which is on the right vertex. The patient stated that three years ago he had been troubled with bronchial catarrh, which had existed more or less markedly up to the present time; he is at present coughing, having considerable morning and afternoon expectoration, and has fallen in weight from 152 to 137 pounds. He has never spit blood, and until the last few days had a good appetite. Family history indicates that the father and mother both died of pneumonia. Examination showed a weak, anæmic, and thoroughly debilitated patient, with the general ensemble of symptoms spoken of in the first part of this history. Examination of the *right* ear showed a narrow canal with the upper and posterior wall bulging; the drum indistinctly made out with an opening probably existing in the posterior inferior quadrant; this latter was filled up by protruding polyp. The outer ear seemed to stand out from the head more than its fellow, owing to a swelling above and behind it which was extremely tender. The swelling diminished down toward the tip of the mastoid, which was only a little swollen and scarcely tender on pressure. The glands in the neck were not involved, nor were there any signs of phlebitis. His temperature was 100°, pulse, as stated before, soft, and from 100 to 120. His heart had a systolic murmur, which was transmitted to the axilla and was very loud; apparently however the heart compensated. The lungs showed over right apex slight dulness, prolonged and higher pitch expiration.

It seemed certain from the above that the patient had some involvement of either the upper mastoid cells, or the whole mastoid, with the impending, and perhaps even now existing, meningeal complications. The case, however, was atypical, for the tip of the mastoid was, as stated, almost entirely free from swelling, and but little tender. The swelling behind and above the ear extended as far front as the temporal region, and was the seat of the greatest pain as well as the greatest tenderness. Examination of the retina had shown nothing that would aid us in the diagnosis. The patient was in very poor physical condition, and the heart was not such as to make one desirous of giving an anæsthetic. In fact the general appearance of the patient, and his history, was such that one could but think that the whole process might be tubercular, with beginning tubercular meningitis. I felt, therefore, justified in allowing the patient to remain at his home for a day or two, provided an increase in the symptoms did not take place. I made sure that the drainage from the middle ear was perfect by removing the polyp with a snare, after which he readily blew through the ear by the Valsalva method. Leeches were ordered to be put on immediately, the bleeding was encouraged for four or five hours, and ice immediately applied over the swelling and over the mastoid for periods of two hours four times that day. The patient returned the next day somewhat brighter as regards his mental condition, with the swelling somewhat diminished, especially over the mastoid proper. The headache was better. Temperature the same. He was ordered to keep up the local treatment which had been given, and on the following day, not having gotten any better, was sent to the hospital. He was put to bed, had his ice continued more frequently, and again an improvement of forty-eight hours resulted. But on the night of the 24th his headache again came on, notwithstanding that the ice had been applied to the shaved vertex at intervals during the last forty-eight hours. The swelling over and above the ear had increased so that it extended well forward into the temporal region ; he had had no more chilly sensations, no more sharp rises of temperature, but pretty constant headache.

The afternoon of that day Dr. W. W. Hawkes and myself considered it advisable to *open the mastoid*, and it was accordingly done in the usual way. The cortex of the mastoid was found in fair condition, and opening up of the antrum disclosed practically no pus. We extended the opening a little upwards toward the region of the external swelling up behind the ear, and found nothing of any particular moment, and we were considering the possibility of having to open directly into the cranial cavity in some other way, when *a thin stream of pus was seen running out of the bone into the wound from its upper part.* Probing showed that it came through a small canal in the bone proper, and following its lead we chiselled through soft bone *upward and backward* for three-quarters of an inch, when we opened into quite a considerable cavity filled with pus. We then extensively laid the cavity open by removing the cortex so as to give perfect vent to the discharge, and to thoroughly search for the granulations and diseased bone all around. Probing into the cavity upwards and toward the brain, we made out indistinctly the dura which seemed healthy, and carefully pressing it away from the edge of the small opening we found no evidence of any further collections of pus. However, after the first evacuation of the cavity into which we broke, there had been no further flow of pus into the wound. Having satisfied ourselves that we had thoroughly drained all probable retention spaces of the pus, and having in so doing already made a hole as large as a good-sized pigeon's egg above and behind the ear, we packed the cavity with iodoform gauze, and having made sure that there was nothing that needed scraping out in the canal of the ear, we bandaged the patient up. His temperature before the operation was 102°, and the following morning it had gone down to 99°, and through the day it rose to 100°. During the subsequent recovery of the patient it did not rise above that point. The patient made from then on an *uninterrupted recovery*, except that he complained of a good deal of *headache* during the first five or six days. By July 11th, the wound had sufficiently healed so there was only a small opening leading through the skin to a small cavity in the bone. By the 21st of July the opening had entirely healed, the patient had recovered, and was able to hear the watch ten inches removed from the ear. The discharge from the ear had stopped, and the hole in the drum closed within ten days after the operation. The patient had also gained in weight, lost his cough, and was in every way in splendid condition.

In commenting on this case it is only necessary to say that a very brilliant result had occurred under very discouraging conditions at the start. Where one would have expected a very tedious and very slow response and recovery, the reverse had been the case. Just why the patient had had this peculiar complication and involvement of the superior mastoid cells and overlying bone, with penetration toward the dura and some pus formation underneath it, is not apparent. He certainly had in every way a normal mastoid, in that respect quite different from Case 2, which was exactly similar in its clinical history. Incidentally it may be remarked, the patient bore his anæsthetic quite as well as any patient could.

CASE 2.—**Mastoid Empyema and Epidural Abscess—Breaking into External-Ear Canal.**

Mrs. M., was sent to the hospital December 12, 1896, with a history of having had a gathering in the *left* ear seven weeks ago; membrane had been punctured early, free drainage given, and in every way attended to in a desirable manner. The discharge, in spite of all treatment, had continued, and about ten days ago there appeared a swelling and tenderness at the anterior and upper edge of the outer ear which extended backwards over the ear to the region of the mastoid. At the time of admission the swelling was very red, tender, and extended from in front, over ear and down on to the mastoid, forcing the auricle downward and outward. The temperature was 99°.2 and pulse 142; the opening in the drum membrane was still present. The patient was in good physical condition, but seemed to have more general headaches than the swelling of the parts would account for, which latter seemed to be due to an abscess probably developing either in the periosteum, or in the deeper connective-tissue layers behind the ear, more above than behind. The tip of the mastoid was entirely without tenderness, and scarcely swollen. The canal of the ear was narrow, owing to the bulging down of the upper wall. At that time there was no evidence of any pus in the swelling, which was dense and hard, and seemed to show simple infiltration. Leeches were applied on the night of the 12th, irrigations ordered, and the tension in the swelling was considerably relieved in the morning. During the following three days the swelling seemed to subside, the patient complained of less tenderness, and the whole infiltration softened. On the 17th she complained of renewed pain and a sudden increase of the swelling, together with what appeared to be fluctuation directly above the ear. On the following day the nurse said that during the night there had been a sudden discharge of pus from the ear, and the swelling had gone down. By pressing firmly upon the swelling above and behind the ear I was able to evacuate a large amount of pus through the canal of the ear, and I concluded that, as I had supposed, an abscess had formed externally to the bone and had opened down and through the superior wall of the canal of the ear. So much did the swelling go down that I felt the whole trouble with the case was probably at an end, as on one or two previous occasions I had had a similar abscess terminate. On the following day, however, the patient reported as having had constant pain since my visit, that the swelling had extended farther up toward the vertex and farther toward the forehead, and evidently there was renewed pus formation. The head was shaven immediately in the neighborhood of the ear, the surface benumbed with ethyl chloride, and a free opening made into the abscess above and just a little behind the upper edge of the outer ear where it joined on to the head. On probing into the wound I readily came in contact with the denuded bone, and felt quite sure I entered a slight fistulous opening. There was then no room to doubt what procedure was necessary, and on the following day Dr. W. H. Carmalt and myself opened the mastoid. The first opening was made into the bone in the usual position ; the cortex of the mastoid was removed but no antrum was discovered ; in fact, as we subsequently found, no large cavity existed in the main part of the mastoid process, and while probing around carefully in search of possible retention areas it was discovered we had uncovered the lateral sinus, which latter had occurred in the ordinary process of carefully scraping out with an ordinary sharp spoon. Very carefully we removed the bone which, after the cortex had been uncovered, proved very soft and spongy and full of granulation tissue, and we were obliged to remove the bony wall of the lateral sinus for the space of from one quarter to one half of an inch ; the vessel itself seemed perfectly healthy. Chiselling upwards, we removed the thoroughly disorganized bone up to the fistulous tract which had led to the surface, and which was almost in a vertical line above the entrance of the bony ear canal. No considerable cavity was found anywhere where the pus could have been retained, and having reached healthy bone in all directions the wound was packed as usual and dressed. Notwithstanding the free opening made in the bone, it was not possible to make the water syringed into the canal of the ear come out of the opening back of it, and even now the only way of explaining how the pus entered the canal of the ear is to conclude that it must have burrowed its way in between the cartilage of the ear and the bony wall of the canal, and thus broken down into the ear. There was no break in the outer table of the skull anywhere except at the edge of the bony canal.

The patient made an uninterrupted recovery, had only at one time temperature 100½° three days after the operation, which I had conceived to be due to rather tight packing. She, however, had considerable swelling over the side of the head and headache for nearly five days after the operation, causing one to fear lest perhaps after all the pus had worked its way through into the cranial cavity proper. The lateral sinus which, as stated, had been uncovered in the process of the operation, was soon covered over with granulations, and seemed in no way to interfere with the progress of the case. During the last two weeks of her stay in the hospital, which terminated on the 8th of January, she was able to blow through, by holding her nose, from the middle ear into the wound back of the ear; this, however, ceased in the course of a few days after leaving, and since then the wound has entirely healed. The opening in the drum closed about ten days after the operation.

In commenting upon this case, as stated previously, the evident reason why the pus took the peculiar channel of arriving at the surface was plainly owing to the poor development of the mastoid, which made the upper cells the avenue of exit to the pus when it had once become involved by the invasion of the purulent matter.

CASE 3—**Purulent Collection in Lateral Ventricle.**

A man, forty years old, was brought into the hospital April 24th in a comatose condition with a diagnosis of meningitis. History said that about a week ago the patient while on the way home from work became faint and weak and fell against a fence to the ground in front of his own house. He did not then become unconscious, but with some assistance got into the house ; he was, however, stupid, felt sick, and remained at home the next day, only to grow more and more inclined to sleep, during which time he was very restless and moaned ; when aroused he seemed dazed, but was generally coherent in his answers. Two or three months before he had had a similar dizzy spell and for six weeks past had had severe headaches, mostly on his right vertex. During all of the last two weeks had felt miserable and was half sick up to the day of the fall. His condition kept, as stated, growing worse and worse from the date of the fall until brought into the hospital. He had been known to have had a discharging ear for some years, to which he had paid no attention. When he was brought into the hospital he would lie for hours in a stupid, half-comatose condition, eyes half shut, pupils small but movable, mouth open, picking at the bedclothes, and occasionally rolling head from side to side as if in pain ; if the right side of his head was touched he immediately winced, and if pressure was made he would cry out with pain and try to remove your hand. He seemed to have, however, no especial spot of more extreme tenderness ; even pulling the ear and pressing on the mastoid elicited no more outcry than if any part of the right side of the head was touched. Frequently he would appear to have a delirium, during which time he would mutter in an incoherent way ; his neck was stiff. Temperature 103°, pulse 64, and respiration 26, in the afternoon. On thoroughly examining the other organs of the body there seemed to be nothing wrong with them ; a few soft rales behind in the lower part of the chest, which later increased in number, was all that could be found out of the way except in the head ; and as to the condition of the latter, other than that a meningitis existed, we got no help from the reflexes, or from any symptoms of paresis, or paralysis of the muscles, facial or otherwise, and dilating the pupils and examining the retina also showed us nothing. The right ear presented the ordinary appearance of chronic purulent otitis. The patient objected very seriously to any attempts at cleansing the ear, and at such times would rouse sufficiently to answer the question, " Where does it hurt you ? " by pointing to his right ear. As judged by his ability to pick the speculum from the ear there was no lack of coördination of the muscles of the arms, for he would reach and take it out with either hand. His head was ordered shaven, his ear douched, and ice ordered applied to the head ; ergot, bromide, and iodide were started on the second day, and the urine drawn by catheter every six hours. Under this treatment, in the following two days he seemed to improve somewhat ; brightened up quite a little ; temperature rose and fell with morning remissions and evening exacerbations. He even presented a much brighter sensorium, on the third day, having recognized his wife, who called upon him, and stretched out his hand to her. Notwithstanding the improvement, however, his condition gave us no clue as to the localization of the brain pressure, and left us no other explanation than that he had a general basilar meningitis, and when on the 29th he made a sudden change for the worse, with Cheyne-Stokes respiration, with a rise of temperature to 103° again, involuntary defæcation and urination, we felt sure that our diagnosis was correct and the end of things was nigh at hand. In this latter conclusion, however, we were wrong, for on the following day there was again an improvement in affairs ; his temperature went down to 99°.5 in the morning and for the next five days he remained in the same condition. There was not the least indication during this time of any localization of the lesion. The fact that he had a running ear, and that the indications were that the trouble might have started from that, led to frequent reviewing of the symptoms of the patient with a view to operation, and we all, of the consulting staff, were agreed that it was not advisable to operate in this case. He at no time during this period was sensible ; he took his milk, however, and liquid nourishment regularly, and was one or two nights very quiet as compared with what he had been at first.

About this time feeling desirous of at least giving the patient the benefit of the doubt, and during rather a lucid spell on the patient's part, we attempted to scrape out the middle ear, thinking that by making sure that there was no damming of any pus in the interior of the ear, we might alleviate the condition of the patient somewhat, but we found nothing except a mass of detritus and granulation tissue, which latter, however, we thoroughly removed.

On the 4th of May the patient began to cough at very frequent intervals, and would sometimes be able to expectorate what he had coughed up, and at other times he swallowed it. His breathing, however, would run up to from 40 to 56 per minute ; the rapid breathing seeming to come in waves, or a sort of atypical Cheyne-Stokes. This condition of things continued until the 8th, during which time the temperature did not go above 101° ; his lungs showed some hypostatic congestion. On the 8th he began to grow worse, was unable to take his nourishment, was absolutely stupid, and with gradually rising temperature, reaching on the 9th to 107°, he died.

At the **autopsy** there was no disease of any of the internal organs, except the hypostatic condition of the lungs, and a slight transudation into the pleural cavity. On opening the cranial cavity the brain showed no abnormalities on the vertex. As the brain was removed from the skull the base showed one or two slight spots of cloudiness in the pia mater, in the region directly in contact with the petrous portion of the temporal bone on the right side ; otherwise absolutely no trace of the basilar meningitis which we had diagnosed. Opening the brain we found the lateral ventricles, especially the right, filled with serum, that in the right half being the least trifle milky. Following the choroid plexus down into the descending horn of the ventricle, we were surprised to find it thoroughly disorganized for from a half to three quarters of an inch from the lower end. This latter appeared like a purulent clot possessing all macroscopic characteristics of the pyogenic clot, which one occasionally removes from a case of phlebitis where the purulent degeneration has taken place in the clot. There was no pocket of pus in this mass, and the blood-vessels of the plexus seemed to lose their identity on entering it. The upper part of the plexus seemed to possess its ordinary color, and the vessels seemed to have been still functioning, at least most of them. This clot lifted easily, was not attached to the lower wall of the ventricle to any greater degree than the plexus itself usually is, and the brain substance immediately in connection with it, aside from being discolored as though by extravasated blood, showed no other abnormalities. The *cloudy spots on the base of the brain*, which, however, had no absolutely fluid pus connected with them, *corresponded to the area lying over against the descending horn of the lateral ventricle;* otherwise there was absolutely no abnormality found in connection with the brain. On stripping the dura from the petrous portion of the temporal bone on the spot which corresponds to the roof of the tympanum, there was a slight adhesion, and the bone was discolored for an irregular area as large as half a pea. On pressing on this with the point of the forceps it crumbled very easily, and with almost no effort the forceps slipped through into the middle ear, which was found full of pus and granulation tissue. The internal ear seemed to be healthy.

Evidently here we had to do with a caries of the roof of the tympanum, and from here the purulent process made a jump into the lateral ventricle. Just how this could occur without involving the meninges is not plain, and why the patient died without more obvious lesions does not yet appear. One would scarcely have expected such a straight set of symptoms pointing to a basilar meningitis without having more evidence of the same than were present in this case. Just what to have expected in the way of symptoms from a purulent degeneration of the choroid plexus is also a matter of conjecture, as no case of the kind has ever come to the writer's knowledge, but it would seem reasonable to suppose that, with the purulent process occurring in such a vascular organ as the choroid plexus, we should have had septicæmia or pyæmia, and the formation of multiple abscesses in other parts of the body. Why also this simple purulent mass should have produced such profound coma without making a greater pressure I cannot explain, unless it is to be supposed that the serum with which the lateral ventricles were thoroughly filled may have had sufficient tension to induce pressure symptoms. That a profound coma due to toxæmia resulting from the immediate absorption of the products of the purulent 'mass into the brain should have existed for sixteen or seventeen days would seem improbable.

And last of all it seems quite anomalous that such a distinct caries of the roof of the tympanum could take place and no basilar meningitis result. That the process should jump through the thin layer of the brain-tissue into the choroid plexus, is no more difficult of conception than that the purulent process should occasionally invade the meninges without any *apparent* break in the bone forming the roof of the middle ear.

CASE 4.—A Trapezius Abscess.

For the history of this case I am indebted to Dr. E. W. PIERCE, of Meriden, Conn. He observed the case for some considerable time and has kindly jotted a few facts down for my use.

W. H., thirty-three years old, no specific history, family history good, consulted Dr. Pierce on December 10, 1895. He had had a chronic otitis media purulenta of the right side of some years' duration. Examination showed no tenderness over the mastoid, but considerable swelling above and behind the latter, with fluctuation one inch to right and below occipital protuberance. An incision at this point gave escape to one ounce of laudable pus, he could then pass a probe three inches in a downward direction; the cavity gradually healed and the swelling subsided. The otitis, however, continued in spite of the best of treatment. On March 28, 1896, the patient returned with a large swelling in the same situation as before, and a free incision was made into the same point as in the first instance, and a large amount of pus escaped. The probe then passed down to the periosteum, but not toward the mastoid, over which there was no tenderness. The swelling subsided gradually and healing occurred. Later, swelling recurred, and discharge from former opening commenced. On May 5th, the tumor was again incised four inches below the upper opening, and at the depth of two inches a cavity was found. One could syringe through from below and have it come out at the upper opening. Dr. Pierce then refused to treat the case unless the patient would go to the hospital, and have an extensive opening of the entire cavity to find the source of the trouble, presumably the mastoid cells. This the patient consented to do on May 28th, and at that time I first saw the case with Dr. Pierce. There was still no. tenderness over the mastoid, but there was a slight swelling over it, and the original upper opening of the abscess was still present, although at the time closed over with a small scabby cicatrix. The abscess cavity had been for the last two or three days thoroughly distended, as the pus had had no recent outlet. It was as big as an orange, and at the bottom very thick-walled, for it will be remembered that Dr. Pierce, in making the lower opening, had to penetrate nearly to the depth of two inches before reaching the lower part of the cavity. It was evident that the abscess cavity lay then beneath the muscles of the superficial layer of the neck, and found its opening up and around back of the trapezius muscle, which latter was really an outer wall of the abscess.

After carefully examining the case I came to the same conclusion as Dr. Pierce, that there could be no other explanation of the continuance of the formation of the abscess than that the mastoid cells were responsible, and to make the diagnosis sure we first opened the abscess cavity at the superior opening. The first incision was through old cicatricial tissue, and bled profusely. After succeeding in stopping the hemorrhage we could readily pass a large probe down through underneath the muscle layers, and after considerable manœuvring found a track that led unmistakably toward the mastoid. *We then opened the mastoid cells in the* *usual way, found a healthy cortex, but on going through it opened up an antrum which was full of pus, granulation tissue, and cheesy bone.* In scraping away diseased tissue, following the rule of latter days of making the removal, if necessary, toward the tip of the mastoid process complete, we almost removed the entire lower end of the mastoid process and the outer wall up to the antrum. The *posterior and inner wall of the tip of the mastoid process showed a fistulous track*, and following it with great care we were able to trace it downward behind the adjacent muscles, and could readily see the way it had taken to get through between the layers of the deep fasciæ of the neck to the abscess cavity under the trapezius muscle. Having thoroughly explored the beginning of this fistulous track, and removing all dead tissue connected with it, and having made sure that all the diseased tissue in the mastoid cells was thoroughly scooped out, we turned our attention to the abscess proper, and after considerable thought concluded that the best way to do would be to make an opening into the deep portion of the abscess and pass a drainage-tube down through from the upper opening. This was accordingly done.

The convalescence of the patient was slow, but he was finally discharged, August 5th, cured. The otitis had ceased, the mastoid opening had healed up, and the abscess cavity was a thing of the past.

The history of the case is a plain demonstration of the fact that perforation may take place backwards through the tip of the mastoid, as was the case in the present instance. Generally in such cases where the perforation takes place through the tip of the mastoid, the pus runs down along the sterno-cleido-mastoid muscle, and may later involve the deeper fascia. The curious fact is, however, that this could have taken place in this case with no marked mastoid tenderness at any time in the history of the affair. It is to be understood that, in speaking of the perforation as having taken place backwards, it is meant not through the posterior edge alone, but on the inner side of the mastoid toward the spinal column, and that this would account for why the pus had to go into the deeper layers for its outlet, rather than to have taken the usual superficial course.

HYPEROSTOSIS OF THE EXTERNAL AUDITORY MEATUS.

By Dr. ARTHUR HARTMANN, of Berlin.

Translated by Dr. J. A. Spalding Portland, Me.

I HAD the pleasure of exhibiting to the Second German Otological Congress, in 1893, two specimens of hyperostosis of the external meatus from my own collection. I then argued that these must be cases of anomalies of development, because the simultaneous appearance on both sides, the limitation of the anomaly to the pars tympanica, and the perfectly uniform consistency of the rest of the bone would allow of no other opinion. To these proofs I now have to add a hereditary predisposition. For, a patient who lately consulted me for furunculosis of the external meatus, exhibited a hard bony swelling of the walls of the meatus, the posterior wall, particularly, bulging forward in a marked degree.

I at first considered that the swelling was simply inflammatory, but when I examined the other—healthy—ear, I found in it precisely the same alterations. And after making inquiries, I perceived that both the mother and a sister of the patient were affected in the same manner, although up to the time of my examination they had never been aware of the deformity.

A further investigation of literary sources has later shown to me the frequent occurrence of hereditary influence in similar cases. Thus for instance, Boyer[1] discovered hyperostosis in the ears of a lady, her father, brother, three sisters, two nephews, and all of her own children. Schwartze[1] also remarks that he has several times observed a hereditary influence in this direction. And Blake[2] says that most of his cases were of a hereditary nature, and he cites one instance of exostoses in three generations of a family.

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[1] Nelaton, *Éléments de la Pathologie Chirurgicale.* Sec. Edit., 1869. Tom. ii., p. 497.

Now as it happens that of late years both hyperostoses and exostoses have been described indifferently under the title of exostoses, although they are plainly two different processes, the descriptions of cases vary a great deal, depending on whether the author has had his mind more intent on exostosis or on hyperostosis. That there is an essential difference between the two, is also supported by Virchow, who, with his enormous experience with exostoses, remarked, during the discussion of a paper which I had read in the Berlin Medical Society[3]: "I agree with the reader, particularly in one point, which made itself plain to me many years ago during my ethnological investigations of skulls from the northern portions of the Pacific coasts. I refer to the more diffuse hyperostosis which he has exhibited in his first case. That, I should not call an exostosis at all. Diffuse hyperostosis is quite different from a genuine exostosis. Inasmuch as exostoses have a very typical situation, this interpretation is very plain."

Hyperostosis of the external auditory meatus always limits itself to the pars tympanica, whilst the adjacent squamous portion of the bone has no bony protuberances. If such are found, especially in the anterior portion of the meatus, they do not arise from the squamous portion, but from the pars tympanica, the sutures of which with the squamous portion extend to Rivini's segment in front and behind. The entire pars tympanica may become hyperostotic. At the anterior and posterior walls of the meatus, the hyperostotic thickening advances chiefly towards the middle line, whilst on the lower wall, the thickening is mostly below. For whilst the thickening cannot extend backward, on account of the compactness of the mastoid, nor forward on account of the maxillary articulation, there is no limitation to growth below. In this way, then, we get the slit-shaped contraction of the external meatus, the contraction taking place chiefly in the horizontal diameter, whilst the vertical is mainly preserved. Hence the anterior and posterior wall seem more thickened, and occasionally bulging forward in a nine-pin-shaped form. The hypertrophy is not always uniform, the margins of the pars tympanica particularly bulging forward a great deal, so that the anterior and posterior suture lines of the pars tympanica with the squamous portion appear curved. forward or even rough and jagged. The inner end of the suture often exhibits rough spots in front of and behind Shrapnell's membrane. If the free outer end is much thickened we may be deceived into the idea of a circumscribed exostosis lying at the entrance of the meatus, but on chiselling we find that it is not limited to the entrance, and is not circumscribed, but extends far within the entrance of the meatus and has a broad base.

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[1] *Pathologische Anatomie d. Ohres.*, 1878, p. 41.

[2] *American Journal of Otology*, vol. ii., p. 497.

[3] *Berlin. klin Wochensch.*, No. 3, 1893.

In a specimen of my collection the rounded projection on the posterior wall of the meatus corresponds to the suture line of the pars tympanica and the thickened anterior suture is distinctly pronounced. In a second specimen of mine the sutures are visible as far as the inner end of the meatus; the pars tympanica resembles an incomplete cylinder above, whilst the pars does not lie, as normal, on the same level with the squamous portion, but apparently above it. It would seem as if the pars tympanica were so late developed, that it came to overlie the squamous portion.

The exact relations of the parts cannot be well explained except in actual bone preparations. Drawings from life often fail to give the actual state of affairs, and therefore we must prepare ourselves for investigating these conditions by study of actual specimens. If we so prepare ourselves, we can see, by observations on the living, that the anomaly of development lying at the root of these bony tumors of the meatus occurs much more often than is usually supposed.

All of these structures are to be regarded as anomalies of formation, which begin with the development of the external meatus and come to light with the advancing growth of the pars tympanica. Having seen fourteen cases of bilateral hyperostosis in a studied list of 9630 patients, I fix the proportion, at one in 650. I have never seen any traces of former suppuration in these cases. The growth of these structures generally terminates, so far as my experience goes, with the growth of the individual.

If I were to offer proof that these alterations were simply anomalies of development and had nothing to do with inflammatory or morbid processes, I should emphasize: the absence of alterations which could possibly be referred to previous inflammation; the perfectly uniform condition of the bone, which can in no way be distinguished from the neighboring bone, and especially from that of the squamous portion; the limitation of the hyperostosis to the pars tympanica; the uniform occurrence on both sides; the stationary condition of the tumor in adults; and finally the hereditary influence so often observed.

A CASE OF BEZOLD'S MASTOIDITIS—OPENING OF THE ABSCESS IN THE SIDE OF THE NECK AND IN THE ANTRUM—RESECTION OF THE MASTOID PROCESS—RECOVERY.

By Dr. LICHTWITZ, of Bordeaux, France.

Translated by Dr. J. A. Spalding, Portland, Me.

AMONGST the various forms of mastoid disease there is one which has only lately been described with much accuracy. I refer to that one in which the pus formed in the antrum and mastoid cells makes its exit through the lower and inner wall of the mastoid, instead of exclusively into the tympanum through the aditus, or outward through the external wall of the mastoid, or internally into the cranial cavity. The localization of the outbreak at the lower and inner wall is favored by the condition of the mastoid cells, which at this spot approach quite close to the surface. As these cells are met with chiefly in adults, we may thus explain the relative frequency of the perforation at this spot in advanced years.

Although this type of mastoid disease was mentioned as far back as 1847, and then again in 1872 (compare the bibliography at the end of the paper), yet Bezold was really the first to make a detailed study of both the pathogeny and the symptomatology. For that reason it is now called by his name. On investigating the literature of this disease we find but few cases recorded, and for that reason it seems quite proper to add one more description of a classical case of Bezold's mastoiditis to those already published.

In October, 1894, Mr. D., aged forty-four, was suddenly attacked with otorrhœa on the left side, with pain in the head, and especially behind the ear affected. The ear was treated by a distant specialist. From time to time the discharge would cease, and in those intervals the pain would be worse. The patient came under our observation in May, 1895, with diffuse swelling behind the left ear, and extending down the neck, where there was a well-marked abscess-fluctuation.

There was a perforation in the *Mt*, and hearing was absolutely gone. Irrigation of the tympanum through the tube relieved the symptoms for a while, but abundant pus soon welled up in the meatus. The patient was advised to evacuate the abscess in the neck by pressure, whilst we were to irrigate the tympanum through the tube. But the otorrhœa persisted, and the pulse was very rapid (140 to 170), though the temperature remained normal. Sugar and albumin were absent from the urine.

As the patient did not improve, we advised an operation, to open the cervical abscess and antrum, and this was done on July 21st. The incision, parallel to the auricle and half a centimetre behind it, revealed a good deal of hyperæmic periostitis, but no pus or fistula. Before opening the antrum, the various muscles attached to the lower and inner wall of the mastoid were dissected off, and about 5 *cm* below the insertion was found a large abscess filled with benignant pus.

The next step was to open the antrum with the chisel directed from behind forward, until after prolonged labor in a dense ivory-like tissue the small antrum was gained and found to be filled with pus and granulations. The evacuation was performed with great care, and as we came across a bony fistula we chiselled off the entire tip of the mastoid. The attic appearing normal we did not open it. As we were terminating the operation by cleansing the region of the abscess we were confronted with a copious venous hemorrhage (probably from the vena occipitalis), which, however, we finally stopped by compression with the finger behind and below the process.[1]

The incision was filled with iodoform gauze, some superficial stitches were made at both ends, and a compress bandage applied over all. The result was very satisfactory, for on the next day the pulse had fallen to 100; there was no hemorrhage or fever, the appetite and sleep returned, and two months afterwards the wound behind the ear and the perforation in the *Mt* were totally closed. After a longer interval the hearing began to improve, though the patient complained of considerable tinnitus for many months.

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[1] A similar case without any serious consequences is reported by Moos.

His general condition is now very good, and there is no disturbance in the mobility of the head, although in order to reach the abscess in the neck we are obliged to detach the muscular insertions from the tip of the mastoid process.

This case is interesting because it unites all the symptoms which are known under the title of Bezold's mastoiditis. It is also interesting from an operative standpoint because it shows how successful the surgical interference was. It is impossible to recommend too warmly an operation in all similar cases of this sort. The operation should have in view, not only the opening of the abscess in the lateral region of the neck, but of the focus which produces the pus—that is, the antrum and the mastoid cells. If necessary, we may also resect the tip of the mastoid.

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CLINICAL CONTRIBUTIONS.

I. OTITIS MEDIA PURULENTA ON THE LEFT SIDE. MENINGITIS OR CEREBRAL ABSCESS? APHASIA. OPERATION. DEATH FROM MENINGITIS.

II. CHOLESTEATOMA OF THE RIGHT MIDDLE EAR. DEATH DURING THE OPERATION FROM THE ENTRANCE OF AIR INTO THE INJURED SIGMOID SINUS.

By Dr. A. KUHN of Strassburg.

Translated by Dr. J. A. Spalding, Portland, Me.

I.

MENINGITIS purulenta and cerebral abscess occurring as a sequence to acute attacks of purulent otitis media are extremely difficult to diagnosticate, because most of the symptoms are common to both of these serious affections. The fever may be absent, or very high, it may be constant or intermittent; the headache in both diseases is occasionally intense, unendurable, and constant, and then again it is but transitory and slight. In many cases, we observe excessive sensitiveness on percussion of the affected portion of the skull, whilst in others it is absent. The same may be said of other symptoms, such as the disturbances of equilibrium, vomiting, clonic or tonic spasms of the extremities or of the muscles of the face, various sorts of paresis, stiffness of the joints, contraction of the abdominal walls, and the ophthalmoscopic picture of the fundus oculi: they all vary from case to case. The so-called focal symptoms, (and especially the disturbances of speech) have long been held as a classic diagnostic point between meningitis and abscess, especially when in the *left side of the brain*, Schmiegelow discovering in fifty-four cases of left cerebral otitic abscess, twenty-three with disturbances of speech. This aphasic form is sensorial and depends on a lesion of the sensory centre for speech, or on an interruption of the tracts which connect this centre with the cortical structures. Such symptoms justify us in diagnosticating an abscess in the left lobe, and from that in operating when other symptoms become serious.

Here and there, however, we see cases in which this symptom is deceptive, and for that reason I will here relate an interesting case.

Mr. C. M., a man of good health and never suffering from any disease of the ears, was attacked in the spring of '96 with a violent cold, which led to otitis media in the left ear with the usual symptoms, which gradually disappeared under proper treatment, though the hearing remained permanently diminished on that side. About a month later, a relapse occurred with myringitis and vertigo. Paracentesis evacuated an abundant secretion, but headache and vertigo persisted, necessitating a second paracentesis a week later. After a week or more the patient felt much relieved, but in May vertigo and nausea occurred several times. The fundus of the eye was normal. The vertigo was always toward the ear affected.

All of the unfavorable symptoms gradually abated, the opening in the *Mt* remained patent and some discharge escaped, but the patient felt so well that he was dismissed, and took part in the regimental manœuvres.

This favorable condition did not last long, for, probably owing to exposure in the field, pain and vertigo reappeared in the latter days of May and the patient was again brought to the hospital with high fever, groaning, great restlessness, occasional screaming, partial unconsciousness, severe headache, and partial amnesia during spells of consciousness. Temperature nearly 104°, pulse 100. The head was held stiffly, and a little backward; pressure on the neck was very painful, percussion on the left temple painful, pupils and eye-movements normal, but occasional nystagmus. The right facial was slightly affected with rapid spasms. The abdomen was slightly contracted, and hyperæsthesia of the skin was well marked all over the body.

The aphasia consisted in word-deafness, resonation of words, and paraphasia. He gave uncertain answers. He could not name certain objects, but knew what they were. For instance: He could not say the word "tumbler," but said "There is nothing in it, but shall I try to drink?" If a book were handed, he would call it something entirely different, but would open it and begin to read incorrectly.

The patient being very restless, extremely thirsty, but without vomiting, a consultation was held.

The opinion of the consultants, based on the amnesic aphasia, was that an otitic abscess had formed in the left temporal lobe, and that an operation was urgent and advisable.

The operation was begun through the mastoid, in the manner now in vogue with us, the very small antrum was opened, and a small amount of pus discovered. Next, the tympanum was laid bare, and from there, upward through the roof, the middle cranial fossa was exposed over a surface 4 *cm* wide and 3.5 *cm* deep. Repeated punctures into the violently pulsating brain, and even a cruciform incision into the same, failed to evacuate any pus.

The patient remained quiet until his death on the following day, the temperature and pulse being high and rapid to the end of life.

The autopsy showed the sac of the spinal dura mater filled with pus, and both the dura and pia much injected. The superior longitudinal sinus of the skull was filled with coagulated blood. The pia mater on the left side along the projection of the fossa of Sylvius was covered with a green, purulent, thick tissue. The dura, too, was much injected. Hemorrhagic infiltration of the temporal lobe extended to the extreme tip, whilst from here to the fossa of Sylvius the pia was infiltrated with pus, and the brain as a whole was soft, especially the left temporal lobe.

Repeated transverse and vertical sections of the brain failed to open up any purulent deposit. The second temporal convolution, however, contained a small cavity with blood and the surrounding softened brain substance was filled with bloody ecchymoses.

The dura over the temporal bone was reddened and nothing more, but on removing it the lower portion of the tip of the temporal bone was seen to contain a cavity with a little reddish pus. The edges of the cavity were eroded and through the centre a probe could be passed into the tympanum.

The ossicles were intact, the *Mt* thickened, and exhibited the artificial perforations.

Here then we have a case with amnesic aphasia, a symptom suggesting an abscess in the left temporal lobe, and inducing an operation, but the autopsy was absolutely negative, with the exception of what we may call, on the whole, a suppurative meningitis,—with some important alterations in the substance of the left second temporal convolution. Moreover, the green infiltration of the pia was most marked over this region. These disturbances, together with the circulatory alterations, and the direct pressure of the purulent infiltration of the pia may result in aphasia as Salzer observed[1] in an epidural abscess in the middle cranial fossa. In the same way, Macewen[2] mentions a case of word-deafness and soul-blindness, in a cerebellar abscess, together with a large epidural abscess in the middle cranial fossa. Evacuation of the latter was followed with disappearance of the aphasia. Finally, in Joel's case[3] slight aphasia was observed in acute otitic œdema of the brain.

Another point of interest was the extension in our present case of the inflammation of the middle ear partly to the mastoid, and partly to the posterior section of the pyramid, for the dura of the latter was the direct starting point of the fatal meningitis.

The extreme loss of hearing, the abbreviated bone conduction, abolition of perception of high tones during the progress of the case, showed that the labyrinth was affected. But we did not suspect any active destruction of the bony substance of the pyramid. Up to this time we have been unable to make a microscopic examination of the inner ear in order to see how far the membranous portions were implicated in the disease.

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[1] *Wiener klin. Wochensch.*, 1890, p. 34.

[2] *Pyogenic Diseases of the Brain*, p. 203.

[3] *Vers. d. Otol. Gesellsch.*, 1890.

II.

Cases of aërial embolism have interested surgeons and pathologists for centuries, and a long list has been made extending from the observations of Redi[1] in 1667 to our time, and generally occurring during the removal of tumors of the neck, axillæ, during exarticulation of the shoulder-joint, ligation of the subclavian arteries, and so on. The accident occurs when a large amount of air enters a large venous vessel rather close to the heart, passes from there into the right side of the latter, and then is driven as an embolus into the pulmonary arteries. The stoppage, thus produced, interrupts momentarily all the circulation, no new blood enters into the ventricle, and a rapid and fatal cerebral anæmia of the brain ensues. Slighter masses of air may be propelled forward from the right heart, and in this way critical consequences may be avoided.

Senn's experiments[2] go to show that the bad results of the entrance of air into the veins depend at one time on paralysis of the heart from over-distension of the right ventricle, at another on acute anæmia of the brain, or finally on asphyxia due to obstructed entrance of blood into the pulmonary capillaries.

The picture of aërial embolism is always the same: with a noise like gurgling the air enters the injured vein, and syncope ensues. The lips grow blue and pallid, the pulse ceases, and death ensues in a few minutes. The right ventricle is found enormously distended with foamy blood, whilst the pulmonary arteries are enlarged and partly filled with bubbles of air.

It is generally accepted that there is no chance of fatality when air enters veins which are far from the heart or into the venous channels of the interior of the skull. The latter accident, can only happen, according to Senn, when the head is raised, and when after large loss of blood the pressure in the sinus sinks so low that with violent inspirations the air is sucked into the open sinus. So long as the head is kept low, the pressure of the blood in the sinus remains greater than that of the atmosphere surrounding the patient, and the blood exuding from the incision in the vessel prevents the entrance of air.

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[1] Gurlt and Langenbeck's *Archiv*, viii., p. 219.

[2] *Deutsche Zeitsch. f. Chirurgie*, Band xxv., p. 309.

In the other point of view we may observe, here, that Unterhardt has demonstrated in dogs that as much as 300 *ccm* of air can be syringed into veins lying far from the heart without any serious injury.

Having had the misfortune to lose a patient during an operation for cholesteatoma of the ear by the entrance of air into the open sigmoid sinus, I deem it eminently proper to report the case, both on account of its extreme rarity as well as a warning, in all operations about the ear, which we all know to be so often a prime necessity, to have such a possibility of fatal accident in view with our attention equally fixed on the best means to prevent the same.

Miss G., a pale anæmic young girl of fifteen with a tuberculous family history, but never suffering from any suppuration of the ears, consulted me in June, 1896, for a tumor behind the right ear, which began in January, without pain or previous suppuration, and had in the last four weeks opened spontaneously.

Physical examination shows no abnormity except an open fistula in the middle of the right mastoid, through which exudes some yellow pus, and in the bottom of which carious bone can be felt with the probe. The meatus is filled with pus and granulations, whilst the probe touches nude bone in the tympanum. Owing to great curvature of the posterior wall of the meatus a view of the tympanum could not be obtained. The hearing in this ear was totally lost. A diagnosis of caries of the tympanum and mastoid was made.

At the operation on the following day we discovered a larger fistula in the mastoid than at first appeared, and after deeper chiselling a *white shiny tumor was seen to fill the mastoid antrum.* Careful scraping away of the surrounding tissues revealed to us a cholesteatoma filling the mastoid and extending into the tympanum. Furthermore, a portion of the tumor reached backwards toward the posterior cranial fossa.

After removing the anterior portion of the tumor with the sharp spoon, I was about to go backward and remove the entire tumor behind, and was on the point of chiselling away the overhanging bone when the chloroformer cried: "The patient has stopped breathing."

The hemorrhage during the operation, I will here observe, had been extremely slight.

The patient was now cyanotic, pulse and respiration had suddenly ceased, and the pupils were enormously wide. All possible means at resuscitation (artificial respiration, faradization of the phrenic nerve, massage of the heart through the diaphragm, constant rhythmical pulling forward of the tongue by Laborde's method) were carried on for nearly one hour, but all proved in vain. The patient was dead.

We thought at first that it was a case of death from chloroform, and our opinion was based on the points noticed before the operation was begun: irregular action of the heart, and impure first-tone of the aortic valve. The chloroform was from our own stores and was absolutely pure. The narcosis was carried on, from the beginning, with the most extreme care, for, after the very first inhalations, the previously regular, slow, and rather strong radial pulse began to be so irregular that occasionally, after each, or again after each second stroke, a distinct pause ensued. For this reason, I made the first incision in the skin before the corneal reflex had ceased, and the patient reacted powerfully to the same. After that, the chloroform was only given drop by drop, the breathing was calm, the conjunctival-reflex very marked, the patient stretched all her muscles, and all this, for the reason that we had intentionally decided not to make the artificial narcosis too deep.

At a later stage the patient twice vomited a small amount of greenish biliary fluid, and as a result of that, too, still less chloroform was administered. Whilst, finally, as the cholesteatoma was gradually being worked out from before backward, suddenly the breathing and pulse ceased, and could never again be stirred into activity.

All of these symptoms pointed to a death due to chloroform, but the autopsy performed on the following day taught us that death was surely due to another cause.

A condensed abstract of the autopsy may read, briefly, as follows: The dura mater is elevated above the upper surface of the pyramid of the temporal bone by a pearly white tumor. Farther in front lies a second bunch of the same nature, and at the base of the temporal bone the bone is tinted white with a defect 1 *cm* across, whilst the bony plate is itself extremely thin. The tumors are undoubted cholesteatomata.

The right sigmoid sinus exhibits a large defect in the bony channel, in the shape of a slit 23 *mm* long, and in its posterior portion is a broad opening in the sinus itself, ragged and bloody, and about 3 *mm* long.

The vessels of the convexity of the pia contain some air bubbles.

The large veins of the neck also contain air bubbles, and the left jugular some foamy blood. The pericardium is greatly enlarged, and tympanitic on percussion. The heart itself is large, extends very far to the left, whilst the right ventricle has a marked tympanitic resonance, though it is not very tense. On ligating the heart a loud gurgling noise is heard, and on evacuating the blood it comes clear at first, but later with air bubbles. The deeper portions of the right ventricle contain numerous bubbles of air and foamy coagulum, especially on the tricuspid valve.

The foramen ovale is so wide open that the tip of the little finger can be easily inserted.

The posterior portions of the lungs are bluish-red, with ecchymoses on the pleura, but pressure on the lungs evacuates only dark red blood without admixture of air.

Taken all in all, the autopsy established the cause of death as an aërial embolism in the right ventricle of the heart, arising originally from the sigmoid sinus.

The anatomical diagnosis explains the entire train of symptoms occurring at the time the operation was undertaken: the instantaneous stoppage of respiration and circulation; the cyanosis of the face; and the uselessness of all attempts to restore suspended animation. On the contrary, we miss the abundant hemorrhage often witnessed on wounding the sinuses of the skull, and the gurgling sound invariably produced when air suddenly enters a vein. From this point of view we suppose that the sinus was tightly compressed and contained no blood. We recalled the fact that the patient was anæmic, which would explain the slight loss of blood from the soft parts, as well as in chiselling the bone during the operation. Occasionally the removal of a cholesteatoma from this region is bloodless or nearly so. Hence we may take it for granted that such tumors extend backward and gradually compress the blood-vessels, and even drive out from them the ordinary amount of blood. This is the only explanation of the absence of hemorrhage after injuring this vessel. The same compression would equally account for so easily injuring the sinus, for a healthly sinus does not rupture by any means quickly, but the pressure here gradually softened the sinus, and then the spoon used with but little force entered the walls.

The rapidity of the growth of the tumor argues in favor of calling it a genuine cholesteatoma, whilst its deep encroachment into the surrounding tissues also points in the same direction. And, finally, we urge the fact of the patient's history, without any trace of a previous suppuration of the ear, as a rarity in the etiology of tumors of this nature.

A careful study of otological literature fails to show any similar fatal cases. Guye,[1] in a discussion on the dangers of the operative opening of the mastoid, remarked that in once operating he had wounded the sinus, but that, despite the excessive hemorrhage and air in the veins, the case had recovered. Leaving aside the number of fatal cases from aërial embolism into the veins near the heart, it is remarkable to find but a single case recorded of such an occurrence in injuries of the cerebral sinuses as a whole. This is reported by Genzmer,[2] and describes the extirpation of a large spindle-cell sarcoma of the dura in an aged woman. In order to remove the tumor from the falx, Volkmann, the operator, opened the longitudinal sinus, when suddenly, with a copious hemorrhage, air entered the sinus with a loud gurgle, and the patient died as if struck with lightning. The autopsy revealed large air bubbles in the right heart, and the pulmonary arteries were partly filled with blood. The left heart was empty.

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[1] *Arch. f. Ohrenhlkdé.*, xviii., p. 223.

[2] Langenbeck's *Arch.*, xxi., p. 664.

Air does not usually enter an injured sinus, because the pressure of the blood is normally higher than that of the atmosphere, as Cramer's experiments have shown, and if we lower the amount of blood in the skull by injections of water, it only sinks to 39. But to permit the entrance of air it ought to sink to zero. Hence peculiar circumstances must have favored the entrance of air in this case and that of Genzmer. The latter experimentally demonstrated that aërial aspiration only occurs in dogs rendered anæmic by loss of blood and dyspnœic.

Artificial dyspnœa has likewise been shown as a cause of aërial inspiration in a child whose head was perforated to permit exit from the mother. Bouchard has also found gas in the heart and veins in children who, still living, became the subjects of cephalotripsy. Probably air entered the sinuses as a result of the operation on the skull. Mueller has further reported a case in which the cardiac murmurs, which were distinct before the trepanation, became gurgling soon afterward. Claude Bernard has likewise mentioned the entrance of air into the veins from opening of the cerebral sinuses. Finally, Bergmann writes of a man with complicated fracture of the occiput; slimy fluid ran from the nose and mouth, and four hours later he died. The autopsy showed large aërial emboli, but no mention is made whether the torcular or the transverse sinus was specially injured.

A final supposition in our case is that, during the irregular breathing, at one step in the narcosis, a longer inspiration than usual may have caused slight valvular opening of the sinus, into which the aërial embolism entered with fatal effects.

In order to avoid danger of this sort in similar operations, Genzmer advises us to observe:

(1) That the blood pressure is not too low;

(2) That the patient does not make forced inspirations; and

(3) That the wall of the sinus is always shut off from the air by a mass of fluid.

In conclusion, if the accident has occurred, we may try Senn's suggestion of puncturing the right ventricle in order to evacuate the air and so preventing death.

SYSTEMATIC REPORT ON THE PROGRESS OF OTOLOGY IN THE THIRD QUARTER OF THE YEAR 1896.

BY DR. ARTHUR HARTMANN.

Translated by Dr. C. ZIMMERMANN, Milwaukee, Wis.

ANATOMY OF THE EAR.

261. **KRAUSE, R.** Termination of the auditory nerve in the hearing organ. *Transactions of the 10th meeting of the Anatomical Society*, at Berlin, from April 19–22, 1896. Jena, Gustav Fischer.

262. **SIEBENMANN, Prof.**, Basel. On the central auditory tract and its damage by tumors of the mesencephalon, especially the region of the corpora quadrigemina and the tegmentum pedunculi. These ARCHIVES.

263. **RAWITZ, B.** The brain of a dog with blue eyes. *Transactions of the 10th meeting of the Anatomical Society*, held at Berlin, April 19–22, 1896. Jena, Gustav Fischer.

261. KRAUSE studied the development of the termination of the auditory nerve in the trout and salmon after staining the living tissues with methylene-blue. The nerves, as the peripheral processes of the auditory bipolar ganglion cells, grow into the termini of the nerves and form characteristic terminal goblets from which numerous very fine fibrillæ arise. The latter closely resemble the hair-cells. At the crista acustica the terminal twigs are rather shaped like short, strong claws. KRAUSE (Berlin).

263. The completely deaf animal showed a considerable reduction of both cochleæ and the temporal lobes of the brain.

KRAUSE.

ANATOMY OF THE NOSE.

264. **MAYER, E.** The nasal mucous membrane. *N. Y. Med. Journ.*, vol. xii., No. 11.

265. **Waldow, A.** Investigations on deformities of the maxillary bones from nasal obstructions. (From the aural and laryngeal policlinic of Prof. O. Koerner in Rostock). *Arch. f. Laryngol.*, vol. iii.

265. **Waldow** completes and corrects the results of Koerner's investigations (on the arrest of development and the deformities of the supramaxillary and nasal bones from insufficient nasal breathing, Leipzig, 1891) by communicating that the supramaxillary bone assumes a V-shape after the second dentition only if the nasal obstruction is due to adenoid vegetations.

Zarniko (Hamburg).

PHYSIOLOGY OF THE EAR.

266. **Kuttner, A.** On the hearing power of pigeons without labyrinths. *Pflueger's Arch. f. Physiol.*, vol. lxiv., No. 506, p. 249.

267. **Jensen, P.** On galvanic vertigo. *Pflueger's Arch. f. Physiol.*, vol. lxiv., No. 304, p. 182.

268. **Rangé, P.** The acoustic relief and binauricular hearing. *Rev. hebdom.*

266. **Kuttner** corroborates Ewald's observations on pigeons without labyrinths, particularly that the membranous labyrinth can be totally removed by Ewald's method of operating. Pigeons without labyrinths (without any restraint), and when falling asleep, react to low tones, caution being taken that the vibrations of the air are not directly perceived as such. But they do not respond to high-pitched tones. Ewald's experiments not being conclusive, the following experiment was made: Pigeons, deprived of the labyrinth on one side, were placed on a swing, with their eyes covered, and both ears connected with a hearing tube. The intact ear frequently, not always, responded to the hearing tube, the ear operated on never. According to this experiment the reactions to acoustic irritations would appear to be perceived by the terminations of the sensitive nerves of the surface of the body.

Asher.

267. **Jensen** reached the conclusion that the galvanic vertigo originates in the labyrinth. Experiments on a pigeon, deprived of the cerebrum, showed the galvanic reactions to be in close dependence on the cerebrum. Asher.

268. **Rangé** discusses in detail, that binauricular hearing is just as indispensable for orientation in space and stereoscopic

conditions as binocular vision. This is confirmed by two cases of his practice, in which sudden deafness caused regular paracousis loci, and by experiment if a normally hearing ear was hermetically sealed. ZIMMERMANN (Dresden).

PHYSIOLOGY OF THE NOSE.

269. ZWAARDEMAKER, Utrecht. An improved osmometer. *Arch. f. Laryngol.*, iii., 3.

270. DANZIGER, FRITZ, Beuthen. Investigation on the motion of the air within the nose during respiration. *Monatsschr. f. Ohrenheilk.*, No. 7, 1896.

269. The improved instrument has the following advantages: It is handy, always ready for use, and the olfactory valves are invariable. They are for valerianic acid (1 : 10000) = 0.4 *cm*, etc. Harting Bank, in Utrecht, furnishes the instrument for $2.50.

ZARNIKO.

270. According to DANZIGER the current of air through the nose varies with each individual. The way of inspiration depends on the shape of the nares, and that of expiration on the pharynx. The air strikes only a portion of the interior of the nose, never the concha superior. KILLIAN.

MISCELLANEOUS.

271. GRUBER, Prof., Vienna. Report of his policlinic in 1895. *Monatsschr. f. Ohrenheilk.*, Nos. 4–6, 1896.

272. LEVY, AD. Report of the clinic and policlinic for diseases of the ear, nose, pharynx, and larynx of the garrison-hospital at Copenhagen for the years 1888–93. These ARCHIVES, vol. xxix., p. 202, German edition.

273. FERRERI. On senile changes of the middle ear. *Arch. Ital. di Otologia*, etc., No. 4, 1896.

274. ASCH, PAUL, Strassburg. Sarcoma of the ear. *Inaug. Dissert.*, 1896.

275. GERONGI. Guayacol for local anæsthesia. *Arch. Ital. di Otol.*, etc., No. 4, 1896.

276. LACOARRET. Auricular vertigo and spasm of the tensor muscle. *Revue hebdom. de laryng.*, *d'otolog.*, No. 34, 1896.

277. BAYER, Prof., Prag. On reflexes during narcosis. *Prag. med. Wochenschr.*, No. 27, 1896.

278. **Redlich, E.**, and **Kaufmann, D.**, Vienna. On aural examinations of persons with auditory hallucinations. *Wien. klin. Wochenschr.*, No. 33, 1896.

279. **Danziger, F.**, Beuthen. On the value of acoustic exercises of deafmutes according to Urbantschitsch. *Wien. med. Presse*, No. 32, 1896.

271. Particularly may be mentioned: Two cases of mastoid operations with speedy recovery through secondary suture, and a case of chronic purulent otitis media with caries of the mastoid process, inflammation of the sinus, extradual abscess and pyæmia, ending in recovery. KILLIAN.

273. **Ferreri** examined the ears of 200 old persons clinically, and the temporal bones histologically of two persons almost one hundred years old. The hearing tests are collected in tables. The chief senile changes were: atrophy of the bones, especially the ossicles, infiltration and calcareous degeneration of the joints. GRADENIGO.

274. In his dissertation, suggested by Kuhn, **Asch** gives a review on sarcoma of the ear. From literature he collected 10 cases of sarcoma of the auricle, 3 cases of sarcoma of the external meatus. The article deals chiefly with sarcoma of the middle ear and is preceded by the clinical histories of 3 cases from the ear clinic at Strassburg. Besides these, about 50 cases—*i. e.*, 40 of primary, 10 of secondary sarcoma, have been published. About 20 cases of sarcoma of the internal ear are communicated. To each category Asch gives clinical histories and discusses etiology, symptoms, diagnosis, and therapeutics. H.

275. **Gerzongi** uses a solution of guayacol 2.00; alcohol and distilled water āā 15.00 with a few drops of etheric oil for anæsthesia in pharynx, nose, and ear. GRADENIGO.

276. A man, aged sixty-four, suffered for a year from, at first, intermittent and then continuous noises in his left ear with vertigo. Hearing power very little diminished. Slight retraction and lack of mobility of each *Mt*. Especially the posterior fold of left *Mt* very prominent, the latter adherent. Slight pressure on the hammer with the probe causes vertigo. The noises could not be perceived with the otoscope. Three weeks' treatment with bromides, nasal douches, catheterism, and massage were of no avail. Through *plicotomy and tenotomy* permanent subsidence of the noises and vertigo. G. ZIMMERMANN (Dresden).

277. At the onset of complete chloroform-narcosis a patient

became sensitive through strong sound and passed into a state of fainting (intermission of radial pulse and respiration and pallor) after the operation of a rectal polypus had been commenced. According to **Bayer** this has not been observed as yet. Auditory perceptions usually disappear later than general perceptions in narcosis. H.

278. **Redlish** and **Kaufmann** sum up the results of their examination of 81 insane persons with auditory hallucinations (of which were 50 cases of paranoia, 12 of amentia, 17 due to alcohol) as follows : auditory hallucinations mostly are brought about by an irritation of the sound-perceiving organs besides a peculiar disturbance of cerebral functions. In the majority of cases the irritation started in a peripheral sensory organ ; in a few there were probably functional disturbances of the latter or irritation in the auditory path up to its termination in the cortex.

Pollak.

279. **Danziger** reports on 2 deafmutes treated according to the method of Urbantschitsch. In both cases deafmutism was due to cerebro-spinal meningitis. The first patient could clearly understand all vowels after three months. The second patient, who had otorrhœa of the left ear during his disease, understood loud conversation near the right ear and single words in left ear after four months' exercises. Pollak.

INSTRUMENTS AND METHODS OF EXAMINATION.

280. **Thornton, Bertram.** The telephone and its application to the deaf. *Lancet*, August 15, 1896.

281. **Bezold, F.**, Munich. On the present state of hearing tests. These **Archives**, xxix., p. 1., German edition.

282. **Rangé, C.** On acoumetric notations. *Ann. des malad. de l'oreille, du larynx*, etc., July, 1896.

283. **Killian**, Freiburg. On rhinoscopia media. *Münich. Med. Wochenschr.*, No. 33, 1896.

284. **Wolff**, Metz. A further contribution on the use of the electro-motor in nasal surgery. *Arch. f. Laryng.*, iii., 3.

285. **Hessler**, Halle. A modification of the pharynx-tonsillotome of Schuetz. *Deutsche Med. Woch.*, No. 37, 1896.

286. **Hartmann, A.** Instruments for operations on the tonsils. *Deutsche Aerztezeitung*, No. 3, 1896.

287. Winckler, Bremen. A curette for operations on the lingual tonsil. *Archiv. f. Laryngol.* iii., p. 213.

288. Lester, John C. Hawkbill nasal scissors. *N. Y. Med. Jour.*, Sept. 5, 1896.

289. Thelson, W. H. A modified tonsillotome. *Lancet*, August 15, 1896.

290. Hill, Wm. Tonsil punch forceps. *British Medical Journal*, Sept. 26, 1896.

291. Acland, W. R. An improved mouth gag. *British Medical Journal*, July 25, 1896.

280. Thornton, the medical officer to the deaf and dumb asylum at Margate, describes a portable telephone for the use of the deaf. As a result of his investigation at the asylum he states that it promises to be of material assistance in the education of from 10 to 15 per cent. of the children ; and he claims that it has the following important advantages over the single speaking tube : firstly, that the tones from several receivers can be coupled up to one transmitter, enabling the teacher to instruct a group of children at the same time ; and secondly, the teacher's facial expression and lip movements can be seen by the children, for it is not necessary for the mouth to be applied close to the transmitter as in the case of a speaking tube or trumpet. The apparatus is suited for use at the dinner-table, etc., and could easily be fitted up in the church, theatre, and courts of justice. The cost of the instrument is not very great and can be seen and obtained at Messrs. Maw, Son & Thompson, London. Thornton suggests the name lamprophone (λαμπρος, clear ; φωνη, voice).

Cheatle.

282. In order to obtain a uniform formula of fractions for acuity of hearing (analogous to the one used for the acuity of vision) Rangé proposes that each examiner test his acoumeter instruments (watch, acoumeter, etc.) for the normal average hearing distance. The number found will be the denominator of a fraction with the pathological hearing distance as numerator. According to the physical laws the squares of the distances are to be compared $(\frac{d}{D})^2$. In ascertaining the average hearing-power discriminations, from five to six years have to be made for different ages. In a given case the hearing distance corresponding to the age of the patient has to be taken as the standard.

Zimmermann.

283. Killian calls rhinoscopia media a novel method of ex-

amination, which permits inspection of the olfactory fissure and middle and lower nasal meatus. He uses a modified speculum of Kramer-Hartmann, the prolonged legs of which end in front in two thin flat plates, which may easily enter into narrow fissures. In some cases Killian could inspect the walls of the olfactory fissure, the anterior sphenoidal surface and the opening of the sphenoidal sinus, the middle nasal meatus and the space situated laterally from the inferior concha up to the opening of the naso-lachrymal duct.

284. WOLFF recommends an electromotor made by Reiniger, Gebbert, and Schall in Erlangen, Germany, differing from those generally in use by a kind of a brake at the insertion of the tube, by which the rotations can be accelerated, retarded, or entirely stopped without interruption of the current. Wolff thinks that the instrument will be very useful not only in nasal, but also in aural operations. ZARNIKO.

285. The modification is, that the two-edged knife cuts when pushed forward as well as backward, which will surely remove the entire pharyngeal tonsil, without leaving a piece in front or behind. The instrument is sold in two sizes for $7.50 by Baumgartel, Halle, Germany. NOLTENIUS.

286. The double-ring forceps, formerly described by HARTMANN as conchotome, is too large for the nose, too small for the tonsils. Therefore a smaller instrument was made for the nose and a larger one for removal of the tonsil. It may be used with advantage if the tonsil is to be removed only partially or if it is not much enlarged. Fibrous tonsils are best amputated after previous slitting of the lacunæ. For this purpose Hartmann employs a pointed knife crescent, bent at right angle from the handle (on the surface), not a blunt hook. H.

287. WINCKLER removes the hyperplastic lingual tonsil with an annular knife, analogous to Gottstein's instrument. Description and method of operating should be read in the original.

ZARNIKO.

288. The instrument is an adaptation of SKENE's hawkbill surgical scissors to the nose, and is used for the removal of the middle turbinal, which is done in V-shaped pieces.

M. TOEPLITZ.

289. THELSON has modified Mackenzie's tonsillotome ; the instrument being made entirely of metal, having a shorter blade into which the handle is blocked instead of screwed, to prevent

rotation, and the handle making an acute instead of an obtuse angle with the blade, enabling the operator's thumb to exercise greater power in driving the latter home. CHEATLE.

290. HILL draws attention to Kretschman's tonsil punch forceps for use in removing diseased buried tonsils. CHEATLE.

291. ACLAND has modified the jaws of Mason's and other mouth gags by making the rubber-covered *noses* to close edge to edge instead of exactly over one another. A thinner wedge is thus obtained. CHEATLE.

EXTERNAL EAR.

292. ROBERTSON. Hæmatoma auris. *Med. Press*, Aug. 5, 1896.

293. GRUBER, JOS., Vienna. A case of angioma of the auricle cured by operation. *Wien. Med. Wochenschr.*, No. 32, 1896.

294. ARSLAN. Acute hæmatoma of the external auditory canal. *Arch. Ital. di Otologia*, etc., p. 103, 1896.

295. BRAUNBERGER, EUGEN, Hagenau. On exostoses of the external auditory canal. *Dissert.*, Strasburg, 1896.

296. OSTMANN, Professor, Marburg. Treatment of fibrous strictures of the external auditory canal with electrolysis. *Berliner Klin. Wochenschr.*, No. 34, 1896.

297. BREITUNG, MAX, Coburg. Contribution to the etiology of mental diseases. *Deutsch. Med. Zeitung*, No. 16, 1896.

298. RAOULT. Foreign bodies in the tympanic cavity, operation, detachment of the auricle, opening of the upper portion of the tympanic cavity, removal of the foreign body, recovery. *Revue mens. d'otol.*, July, 1896.

299. PREOBASCHENSKY, L. S., Moskan. On foreign bodies in the ear and their removal. *Wien. Klin. Rundschau*, No. 33, etc., 1896.

300. HAMMERSCHLAG, V., Vienna. On movements of the *Mt* synchronous with respiration and pulse. *Wien. med. Wochenschr.*, Nos. 38 and 39, 1896.

301. RICHARDSON, C. W. A case of hemorrhage from the external auditory canal. *Annals of Ophth. and Otol.*, July, 1896.

302. MCCASSY, J. H. Hæmatoma auris. *Annals of Ophth. and Otol.*, July, 1896.

292. At the annual meeting of the British Medical Association

ROBERTSON gave a very interesting and instructive microscopical demonstration of the stages of this disease. He finds that the primary stage is a degeneration in the cartilage cells, that the new vessels formed in the cystic spaces resulting from degeneration are prone to degenerative changes, and that degenerate areas are common in the mentally sound as well as in the unsound, but no cysts form in the sane. The disease is most marked in general paralysis and in cases of acute mental excitement.

CHEATLE.

293. GRUBER observed a globular tumor of the size of a pigeon's egg on the left auricle of a man, fifty-three years old. It filled the concha totally, had a broad base, was covered with cutis, very elastic and not painful. Operation; recovery. At first the diagnosis of sebaceous tumor had been made, but the microscopical examination revealed a venous angioma. No pulsation could ever be detected. POLLAK.

294. In the left ear of a man, æt. forty, intense pain, with hardness of hearing and nausea, developed without any other premonitory symptoms. The auditory canal was the seat of a fluctuating blue swelling, painful on pressure, starting from the inferior wall with a broad base. Incision evacuated profuse, not coagulated blood. The hæmatoma extended as far as the *Mt.*

GRADENIGO.

295. BRAUNBERGER'S dissertation contains a carefully compiled review of the literature on exostoses of the external meatus. The terms hyperostosis and exostosis have been somewhat mixed up. After a general description he reports three cases on two patients. Case 1: chronic purulent otitis media with two exostoses of the size of half a filbert nut, one on the posterior and one on the anterior wall of the meatus. Removal with the *chisel* in narcosis, *after detachment of the auricle.* The second patient had bilateral otitis media when a child. Hard, irregular exostosis as large as half a bean, in the anterior and inferior portion of the right osseous meatus extending close to the *Mt.* Two oblong exostoses at the commencement of left meatus, springing from the posterior and anterior wall. No operation required. H.

296. OSTMANN obtained a free lumen by electrolysis in a case of fibrous stricture of the external meatus. A current of 4 to 5 MA. was applied for five minutes in four sittings. The pain was intense, reaction very slight. H.

297. BREITUNG'S patient aroused the attention of his schoolteacher on account of increasing hardness of hearing and indo-

lence. After removal of a foreign body, headache, tinnitus, and vertigo disappeared. H.

298. Attempts had been made by physicians to remove a glass button. The title explains the rest. ZIMMERMANN.

300. HAMMERSCHLAG examined the healthy ears of four individuals according to the stoboscopic method of MACH, with the following results : The *Mt* showed constant movements synchronous with the systole of the heart. In quiet respiration the *Mt* moves outward during inspiration in all cases, inward during expiration. The conclusion is : The *Mt* nominally communicates freely with the naso-pharynx. The expiratory current of air conveys the air from the tube and the tympanic cavity on the principle of the aëro-dynamic paradoxon, drawing the *Mt* inward. The inspiratory air-current enters the tympanic cavity as the place of lessened resistance. In regard to the pulsatory movements, Hammerschlag adopts the explanations of other authors who surmise that the lumen of the tympanic cavity is reduced by each systole moving the *Mt* outward. POLLAK.

301. The patient, a negro, female, thirty years of age, a prostitute, when first seen by RICHARDSON in May, 1893, had a syphilitic lesion of the tonsils and pharyngeal walls. About a year later, after these lesions had healed, she complained of an occasional showing of blood in the left auditory canal. The bleeding would take place for a day or two and be followed by an intermission of nearly a week, when it would recur again. This kept up for a period of six months. In February, 1895, the bleeding became more copious and intermitted only four days during the whole month. Since March, 1895, the hemorrhage has been practically continuous. The hemorrhage had no relation to the menstrual function. The auditory meatus was found to be narrowed somewhat on account of a slight thickening of the anterior wall of the cartilaginous meatus. The auditory canal was normal in appearance, but the mem. tympani showed the usual evidences of chronic catarrhal inflammation. The subjective symptoms were as follows : pain very marked, especially about the mastoid and over the parietal region ; pressure on mastoid and over parietal region very painful ; introduction of speculum painful ; tinnitus very disagreeable ; vertiginous attacks frequent and deafness very marked. When the bleeding occurred, the above symptoms were all modified. She received anti-syphilitic treatment with the use of general and local hæmostatics, but without result.

GORHAM BACON.

302. The writer reports five cases as follows: Case 1.—Male patient, aged thirty, whose mind became affected, and two years after commitment to an asylum, there appeared in the left ear a smooth, ovoid swelling of bright red color, tense and tender to the touch. The tumour was the size of a hen's egg. It was painted with iodine. Recovery occurred in from six to eight weeks with a distorted and shrunken ear. Two years later the right ear was similarly affected with like results. Case 2.—A male, aged forty-two years, affected with general paresis. Hæmatoma of left ear appeared, and a free incision was made and blood clots and a little yellowish red serum escaped. The sac was washed out daily with a sublimate solution and packed with iodoform gauze. There was very little deformity. Case 3.—The patient was a male, fifty-two years of age, affected with alcoholic lateral sclerosis. A livid plum-blue colored tumour appeared in the concha. It was painted with cantharides collodion twice daily, but the skin cracked and the bloody contents escaped. It refilled, but finally disappeared by absorption. The result was great thickening and deformity of the auricle. Case 4.—Male, twenty years of age, while driving, fell out, striking his head against the pavement which produced a hæmatoma of the left ear. It was dressed with cold applications at first, then painted with cantharides collodion and absorption took place in about two months' time. Considerable thickening of the auricle remained. GORHAM BACON.

MIDDLE EAR.

303. GOMPERZ, B., Vienna. Experiences in effecting closures of old perforations. *Wien. Klin. Wochenschr.*, No. 38, 1896.

304. CARTAZ, A. Paralysis of the facial nerve of otitic origin. *Arch. internat. de laryng. et d'otologie*, 4, 1896.

305. VULPIUS, W. On the methods of treatment of adhesive aural affections. *Arch. f. Ohrenhelk.*, vol. xli., p. 8.

306. OSTMANN. Popular advice for the healing of aural suppuration. *Leipzig, F. C. W. Vogel, publisher*, 1896.

307. VILLA. Peroxide of hydrogen and iodine in chronic purulent otitis media. *Archives ital. di Otologia, etc.*, iv., 1896.

308. STEINBRUEGGE, H., Giessen. A case of cholesteatoma of the temporal bone. *Berlin. Klin. Wochenschr.*, No. 26, 1896.

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the aspect of otitic phlebitis of the cavernous sinus. These ARCHIVES, Germ. Ed., vol. xxix., p. 92.

310. URBANTSCHITSCH, VICTOR. The operative opening of the middle ear. *Wiener Klin. Wochenschr.*, No. 29, 1896. *Cf.* these ARCHIVES, Germ. Ed., vol. xxix., p. 234.

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312. BREITUNG, M., Coburg. Casuistic contribution to the pathogenesis of otitic leptomeningitis. *Muench. med. Wochenschr.*, No. 34, 1896.

313. DENKER, A. A case of otitic phlebitis of the sinus and metastatic purulent pleurisy; operation; recovery. *Monatschrift fuer Ohrenheilk.*, No. 9, 1896.

314. KOERNER, O., Rostock. Remarks on the symptoms of phlebitis of the cavernous sinus. These ARCHIVES, Germ. ed., vol. xxix., p. 214.

315. DANZIGER, F. Contribution on carcinoma of the petrous bone. *Arch. f. Ohrenheilk.*, vol. xli., p. 35.

316. SHASTID, THOMAS H. Some observations made during the treatment of chronic catarrhal deafness. *Journ. Am. Med. Assoc.*, Sept. 19, 1896.

317. LAUTERBACH, LOUIS J. Phono- and pneumo-massage in suppurative disease of the ear. *Med. and Surg. Reporter*, July 18, 1896.

318. STILES, H. J. "A discussion of the treatment of tuberculous glands in the neck." *British Med. Journal*, Sept. 12, 1896.

319. POOLEY, THOMAS R. On the value of the ophthalmoscope as an aid to the diagnosis of cerebral disease in purulent affections of the middle ear. *N. Y. Med. Record*, Aug. 15, 1896.

320. CLAYTON, J. HAZLEWOOD. "A case of peri-petrous suppuration." *The Birmingham Med. Review*, Aug., 1896.

321. RANDALL, B. ALEX. Extradural abscess from mastoid empyema. *Journ. Am. Med. Assoc.*, Sept. 12, 1896.

322. THERNANDER, H. B. A practical note on trephining for abscess in the temporo-sphenoidal lobe. *The Australasian Med. Gazette*, June 20, 1896.

323. LEDERMAN, M. D. Cerebral diseases following middle-ear suppuration. *Journ. Am. Med. Assoc.*, Sept. 12, 1896.

324. WALL, G. A. Mastoid abscess complicated with lateral sinus thrombosis and diabetes. Operation ; recovery. *Annals of Ophth. and Otol.*, July, 1896.

325. FROTHINGHAM, RICHARD. The importance of an understanding of middle-ear disease by all practitioners, with a report of some cases in which inexcusable errors have been made. *N. Y. Med. Record*, Aug. 8, 1896.

326. BISHOP, SETH SCOTT. A clinical study of twenty-one thousand cases of diseases of the ear. *Journ. Am. Med. Assoc.*, Sept. 26, 1896.

327. YEARSLEY, MACLEOD. "A foreign body in the tympanum." *British Med. Journal*, Sept. 26, 1896.

303. GOMPERZ corroborates the statements of OKUNEFF, who obtained cicatrication of old perforations by cauterizing the edges with trichloracetic acid in 50 per cent. of his cases.

GOMPERZ treated 10 patients in the same manner with the following results : In 4 cases the perforation closed entirely, in the remaining 6 the perforation became decidedly smaller. He does not attribute this effect only to the trichloracetic acid, since in another case the perforation was reduced to the size of a pin by cauterization with liquor of perchloride of iron within eleven days.

POLLAK.

304. Paralysis of the facial nerve due to catarrh of the middle ear is much more frequent than that from refrigeratory or rheumatic causes. It is caused by pressure of the exudation on the nerve, or the inflammation is directly propagated to the nerve : CARTAZ gives instances of either mode. In the first case the paralysis subsided the next morning after paracentesis ; in the second an obstinate regular neuritis had developed, which healed after four months' electric treatment. ZIMMERMANN.

305. VULPIUS attributes little value to the ordinary hearing tests (Weber, Rinné and Schwabach) in ear affections with increasing hardness of hearing. He objects with Toynbee and Wilde, to the treatment of adhesive affections with air-insufflations and prefers massage from the external meatus. Massage is indicated in diminished mobility of the *Mt*, not if the chain of ossicles is immovable. In the latter case LUCÆ's pressure sound is of no value which VULPIUS recommends in anchylosis of the stapes. He saw no effect of the treatment with tones, in regard to improvement of hearing or tinnitus.

Paracentesis, tenotomy, plicotomy are only of transient value.

The excision of hammer and anvil in sclerosis, as frequently practised in America, do not yield the results at first expected. The excision may however be of value in tinnitus and for improvement of hearing, if synechiæ or anchylosis of the external ossicles exist —*provided* that there is no anchylosis of the stapes. The diagnosis of the latter can, according to Schwartze, only be made during operation. VULPIUS devised a hook for removal of the anvil different from the others. The extraction of the stapes gives rather doubtful results.

From the insufficiency of the operative treatment VULPIUS returned to internal medication and recommends thyroid treatment; which he considers useful in moderate sclerosis of juvenile individuals; not in bony anchylosis. For enhancing and preserving the result, massage of the *Mt* is practised for some time. He gives one to two tablets, children half, daily four to five weeks with short intermissions. A result, if at all, is observed in the first or second week, and apparently is due to absorption. G. BLOCH.

306. In order to insure the assistance of patients in efficient treatment of aural suppurations OSTMANN formulated in this little book the necessary rules for the patients of his policlinic. It treats of the cleansing of the hands and the auricle, syringing, washing and drying the ear, dressing, preparation of solutions for injections, instillation of medicines, cleansing of aural forceps, etc. It will be found useful in cases in which a part of the treatment of the ears has to be left to the patient or his relations.

WALTER HAENEL (Dresden).

307. VILLA uses freshly prepared peroxide of hydrogen in combination with a solution of iodide of potassium (1:30) for the treatment of chronic purulent otitis media, which, after instillation into the meatus, develops iodine. He wants this treatment to precede other remedies. GRADENIGO.

308. STEINBRUEGGE relates a case of cholesteatoma of the temporal bone of a woman, aged thirty-seven, who never had any suppuration of the ear. It commenced three weeks before treatment. Granulations were found in the depth of the ear canal, the mastoid process was painful, and the patient suffered from intense pain in the ear and the same side of the head. In opening the mastoid process with the chisel a cholesteatoma was found, 25 *mm* long and 15 *mm* in width and thickness. H.

311. Mastoid process, meatus and tympanum formed one large cavity which, during operation, made the orientation rather

difficult. At the bottom of the cavity the probe entered two recesses separated by an osseous bridge, under which the probe could pass through. MOLL thinks that this may possibly have been a semicircular canal, more probably, however, a new formation of bone over a carious cavity. ZIMMERMANN.

312. A boy, aged twelve years, fell sick with chills, headache, lack of appetite, constipation and insomnia, with sensory irritation, restlessness, and,. according to the statements of the mother, delirium. BREITUNG found apathic facial expression, paleness, hard, full and frequent pulse, increased temperature, sensorium free, pupils normal. Percussion of the head painful. The probe revealed a piece of wood in the swollen meatus, from which pus oozed. All symptoms disappeared after removal of the foreign body. Breitung's assumption of otitic leptomeningitis, derived from the pathognomonic symptoms, does not seem to be correct, since severe meningitic symptoms frequently occur in uncomplicated otitis media, particularly in children. E. MUELLER.

313. Phlebitis of the sinus had developed from a chronic purulent otitis media with perforation of Shrapnell's membrane. The sinus was filled with a solid thick thrombus. The jugular vein was not ligated. The pulmonary complication occurred four days after the operation. Twenty-two days later, opening of the pleural cavity. Complete recovery. KILLIAN.

315. Tumor in front of left ear ; operation ; relapse. Finally sensory aphasia, meningitis. The postmortem revealed a tumor of the size of an apple, forming one mass with brain and petrous bone. The dura is largely destroyed. The left middle temporal gyrus is partly, the inferior totally gone, the superior attenuated through pressure. In the case which the author described last year (*Monatsschr. fuer Orenheilk.*) a suppuration existed for forty years, in this case no aural affection but lues. The tumor was an alveolar cauliflower sarcoma (carcinoma). BLOCH.

316. SHASTID considers operations for the removal of one or more of the ossicles with or without part or all of the drum membrane, and mobilization of the stapes, as being of doubtful utility to the hearing as well as of some though slight danger to life. These operations are often followed by suppuration and do not often produce a really valuable increase in the hearing power. The author has better results in these cases from simple and multiple excision of the drum membrane, partial myringectomy, plicotomy, traction on the handle of the malleus, and tenotomy of the tensor tympani. GORHAM BACON.

317. The writer uses his pneumo-massage instruments to remove discharges from the ear, in connection with wet and dry cleansing. Pneumo- or suction-massage thus applied, he finds, fulfils in part all three of the treatment indications, preventing the extension of the disease, favoring the subsidence of the inflammation, and improving or saving the hearing. It accomplishes these three indications by the complete cleansing occasioned, and in addition the last of these by the thorough kneading movements produced in the conducting apparatus, preventing loss of functional activity and relieving pressure on the internal ear.

GORHAM BACON.

318. In the course of a discussion on the treatment of tuberculous glands in the neck, at the meeting of the British Medical Association, STILES insisted on the necessity of opening the mastoid and clearing out the middle ear in cases of enlargement of glands in the neck due to tuberculous middle-ear suppuration.

CHEATLE.

319. In this paper, POOLEY refers to three cases reported previously by J. A. Andrews, and one by C. J. Kipp, and adds to them one of his own, as follows:

The patient, a male, was admitted to the hospital, July 20, 1892, suffering from chronic otorrhœa of long standing. When first seen, there was a large firm swelling over the left mastoid, which was reddened and very tender. Temp., 102.5° F.; pulse, 128. A Wilde's incision simply afforded temporary relief, for on the following afternoon, the mastoid cells were opened and pus escaped in considerable quantity. Cheesy masses were removed from the antrum, and the dura was exposed over the lateral sinus. On the following day, a paracentesis of the drumhead was performed, as the discharge was slight. Two hours later the patient had severe chills with a temperature of 104.5° F. The next day he was better but complained of severe pain in the head and eyes. Pupils contracted and choked disc on the left side. For twenty days the patient continued to grow worse, and the temperature during this time ranged from 101.5° F. to 105.5° F. He had severe pain in the ear and head, and at times was maniacal. On the thirty-first day after his entrance in the hospital, the patient became blind in the right eye. On examination, however, nothing was found. On the following day the ophthalmoscope revealed slight venous hyperæmia on the right side, and violent choked disc on the left. The patient gradually became comatose, and died.

Autopsy.—Vessels of dura intensely engorged and lifted up. On opening the dura, considerable pus was found bathing the entire left hemisphere and over the brain generally. The entire base of the brain was covered with pus. Optic nerves swollen and sheaths distended. A large capsulated *abscess* was found in the anterior portion of the *occipital lobe* on the left side. There was extensive thrombosis of the lateral sinus extending to the Torcular Herophili. GORHAM BACON.

320. CLAYTON's case was that of a girl aged twelve years, who was admitted into the Queen's Hospital, Birmingham, on February 1st, with the history of discharge from the left ear from infancy, severe headache for five weeks, unconsciousness for two days, and rigor fourteen days before admission. The right side was paralyzed, slight swelling in mastoid region, but no redness. Temperature, 104.6. The antrum was opened, and the left Rolandic area explored with no result except the withdrawal of several drachms of cerebro-spinal fluid. February 2d, semi-conscious, irritable, no paralysis, but twitching on right side. February 5th, trephined over temporo-sphenoidal lobe, nothing found in brain, but a drachm of pus found beneath the dura mater at the bottom of trephine hole. February 7th, proptosis, both eyes. February 13th, the proptosis on the right side subsided, but fluctuation detected over the left upper eyelid and external angular process, a quantity of thick fœtid pus evacuated. Death six hours after. Post mortem, a small abscess the size of a hazel nut in extreme apex of left lower temporal convolution; pus in antrum and on superior and posterior surfaces of the petrous bone, extending into orbit in front through the sphenoidal fissure and plugging the lateral sinus behind. CHEATLE.

321. RANDALL, in this paper, reports a case of a boy with a mastoid abscess as a result of a light blow on a chronically suppurating right ear. Nausea and general malaise immediately followed; fever was marked; no eye changes. The very hard mastoid was chiselled open, and all carious bone in the antrum and adjacent cells curetted away. The fever fell but rose again; pleurisy and pulmonary inflammation followed, and he died on the sixth day after the operation. The autopsy showed a septic pleurisy and pulmonary abscess, while in the cranial cavity, a cerebellar abscess as large as a plum ruptured, in removing the brain, at the point where it was adherent to the subdural collection which extended backward from the tegmen down upon the posterior aspect of the petrous bone. GORHAM BACON.

322. **THERNANDER'S** patient being in a comatose condition, was operated on without an anæsthetic. A point was selected two inches vertically above the bony meatus. A semilunar flap with the convexity downwards then made; the skull being opened at the marked spot by means of a trephine with "multiplying action." A slender silver tube provided with an arrow point then introduced into the temporo-sphenoidal lobe through a small incision in the dura mater, half an ounce of offensive pus being evacuated with immediate relief to the patient. Thiernander thinks that this is the first record of cerebral abscess in Australian surgery. CHEATLE.

323. In this paper, the writer reports three cases as follows: Case 1.—Female, with chronic discharge from both ears for three years. Under local treatment the discharge was checked. Two years later, the child fell and struck the back of the head. Irregular temperature was apparent and some pain about the left ear. A few days later, convulsive seizures were developed. Forty-eight hours later, the mastoid was opened as there was tenderness over the bone. The patient's condition would not allow of further operation at the time. The next day a button of bone was removed and a temporo-sphenoidal abscess found and about three ounces of pus escaped. Patient died on the following day. Case 2.—Patient, sixteen years of age; chronic suppurative otitis media of right ear, resulting from measles, and of one year's duration. When admitted to the hospital, he was delirious; temp. 104° F.; pulse 110; right mastoid swollen; slight redness extending down the neck. The mastoid was opened and a small amount of pus evacuated. The patient died six days later with symptoms of compression. Autopsy: temporo-sphenoidal abscess with thickening of the dura and on the cerebral surface of the tegmen a necrotic area was found. Case 3.—Female, deafmute, sixty-two years of age, entered the hospital May 6, 1895. For the past year she had pain in the right ear with scanty discharge, and three months ago facial paralysis developed on right side. There was offensive and profuse discharge from the right ear. A Stacke operation was performed, as the mastoid was involved, with removal of almost the entire tip of the mastoid. The dura was encountered on passing the probe upward. June 11th, a hemorrhage occurred from the mastoid appearing through the ear, nose, and throat. A second hemorrhage occurred through the naso-pharynx and a post-nasal tampon

was applied. June 14th, the patient died from loss of blood. Autopsy: marked necrosis of petro-mastoid portion of temporal bone; a probe could readily be passed into posterior and middle cerebral fossæ. Ulceration of sinus was cause of hemorrhage. There was also softening of right temporo-sphenoidal lobe of brain. GORHAM BACON.

324. The patient, aged sixty-two years, female, gave a history of pain followed by rupture of the right drumhead and slight muco-sanguineous discharge. Left drumhead intensely red and very painful. Left mem. tympani punctured when some blood escaped. The case continued about the same for ten days when the discharge from the ears became purulent. Urine examined and found to contain seven per cent. of sugar. The discharge from the right ear ceased but the left one was the same as before. About a month later, severe symptoms developed, viz.: chills, high temperature and severe sweats with marked tenderness over the mastoid and tenderness and induration along the anterior border of the sterno-cleido-mastoid muscle. The patient was etherized, the mastoid opened and the sinus exposed. The sinus was excised and clotted blood was removed, after which a free hemorrhage ensued. The wound was then packed with iodoform gauze. The patient made a good recovery and, under a regulated diet, the sugar in the urine diminished very much in quantity.

GORHAM BACON.

325. The writer calls attention to the fact that in the medical colleges very little study is made of diseases of the ear, and that with the best intentions, the average physician assumes the responsibility of treating all acute and suppurative diseases of the ear. After referring to the anatomy of the ext. aud. canal, the middle ear, the mastoid cells and the prognosis of middle-ear diseases, he concludes with a report of a number of cases of diseases of the ear, in some of which serious complications developed, and which had been improperly diagnosed and treated.

GORHAM BACON.

326. The table published by BISHOP comprises 15,300 cases in addition to 5,700 which he has already reported.

Of these 21,000 cases, 11,119 patients had occupations classified under 28 headings; of this number, 3,813 had out-door work, and 7,306 in-door; the largest number of any one class were in-door workers, viz.: 3,045 domestic servants; next in number were 1,508 day laborers. Sex seems to have no influence in the production or prevention of diseases of the nose, throat, and ear. Up to the age of 15 years, both sexes suffered nearly equally.

As to the relative frequency of diseases of the right and of the left ear and of diseases of one ear as compared with diseases existing coincidently in both ears, the table shows that in acute inflammation of the middle ear, there is but slight difference in the frequency of involvement between the two ears, and both ears were affected in 24 per cent. of all cases. In acute suppuration of the middle ear, there was all but a slight difference between the two ears. In 15 per cent. of these cases, both ears were involved. In chronic suppurative otitis media, the two ears suffer nearly equally and both ears are simultaneously affected in a little more than 60 per cent. of the cases.

About 0.8 per cent. had mastoid disease and deafmutes formed about 0.5 per cent. of the 21,000 cases.

GORHAM BACON.

327. YEARSLEY removed a small pellet of wool, which had slipped through a perforation in the posterior half of the membrane into the middle ear. CHEATLE.

INTERNAL EAR AND AUDITORY NERVE.

328. LERMOYEZ, M. Chronic anæmia of the labyrinth and an experiment with amyl nitrite. *Ann. des mal. de l'or.*, July, 1896.

329. ALT, FERD. and PINELER, Vienna. A case of Ménière's disease due to leukæmic affection of the auditory nerve. *Wien. klin. Wochenschr.*, No. 38, 1896.

330. ALT, FERDINAND. On apoplectiform diseases of the labyrinth in caisson-workers. *Monatschr. fuer Ohrenheilk.*, No. 8, 1896.

331. KENEFICK, THOS. A. Ménière's disease. *N. Y. Med. Record*, July 25, 1896.

328. A man, aged forty, suffering from diabetes, formerly syphilitic and addicted to alcohol, soon after an abstinential cure noticed tinnitus, hardness of hearing, and attacks of vertigo as often as three to four a day. These symptoms became less frequent within three and a half years, but never subsided entirely. *Mt* very much retracted and little movable, the left *Mt* thickened; through the right *Mt* the promontorium is visible. Hearing power very much reduced, especially in left ear, which hears low

voice at 0.16. Osteo-tympanal conduction abolished for the watch.

Weber in the better right ear, Rinné +. Catheterism produces neither noises nor was followed by improvement. Dietetic restrictions make matters worse. Five months later injections of pylocarpine but without result. The patient always felt heavy in the frontal region after his meals but heard better and had less noises. LERMOYEZ inferred from this that there must be anæmia of the labyrinth (not hyperæmia, as he had thought at first), which was beneficially influenced in a dyspeptic person by the congestion of the brain during digestion. His assumption was corroborated by an experiment with amyl nitrite, which increased the hearing power from 0.18 to 0.33, and from 0.20 to 0.37. Lermoyez prescribed for constant use a weak solution of trinitrine, which improved the hearing to 0.60 and 2.00. A deterioration followed the discontinuation of the drug. Lermoyez adds to this detailed clinical history an elaborate discussion of the clinical experience on disturbance of circulation, particularly on the rare occurrence of anæmia of the labyrinth, and calls attention to the diagnostic value of amyl nitrite in doubtful cases and the therapeutical effect of trinitrine. ZIMMERMANN.

329. A typical case of apoplectiform Ménière's disease with normal middle ear and no labyrinthine affections. As the only anatomical morbid change an isolated leukæmic affection of the auditory nerve was found. POLLAK.

330. Caisson works in Vienna, 25 *m* below the level of the Danube River under a pressure of 2.5 atmospheres offered an opportunity to ALT to observe three cases of sudden labyrinthine disease, which commenced with the symptoms of Ménière's disease one half to two hours after leaving the caisson. The laborers were otherwise healthy. In one of them a severe collapse occurred, in the other total unconsciousness. All had intense vertigo and were almost deaf. Tests with the tuning-fork undoubtedly suggested the labyrinth to be the seat of the affection. Experiments on animals confirmed this explanation. Some ears remained almost deaf, others gradually improved to a certain limit. If no sufficient interchange of atmospheric pressure between the tympanic cavity and the outside air takes place through the tube, the *Mt*, middle ear and labyrinth become the seat of intense hyperæmia, from the negative pressure within the tympanic cavity, leading to ecchymosis and transudations. The latter makes transient

symptoms. ALT explains the late onset of the disturbances from his measurements of the blood-pressure with Basch's sphygmomanometer, which showed differences of pressure up to 40 *mm.* On entering the caisson the blood-pressure sinks, on leaving it surpasses even its former degree. The altered vessels may withstand such an increased pressure only for a certain time. We would have liked to know how long the change of blood-pressure persisted after leaving the caisson. KILLIAN.

331. The patient was a man forty-five years of age, robust and healthy in appearance, who had enjoyed good health but who had been a very hard worker, being an architect by profession. The history of the case was that on the previous night he was suddenly aroused during sleep by a violent attack of vomiting of dark greenish fluid and accompanied by extreme dizziness, tinnitus, and marked deafness. An examination of the tympanic membrane showed slight congestion. The vomiting and dizziness continued for several hours, then ceased, only to return on the least movement of the head or body. The vomiting yielded to small doses of ipecac, but the dizziness and deafness persisted. In addition, there were certain symptoms of perverted vision, but these vanished the same day on which they appeared. Nothing abnormal was found in the urine, and his general condition was excellent.

The vomiting ceased, but the deafness remained about two weeks when this and the giddiness gradually improved, and at the end of six weeks he managed to get about with a tottering gait and by the assistance of a friend. The recovery was complete. The treatment consisted in the administration at first of large doses of quinine, and later a combination of bromide and iodide of potash. Galvanism was also used.

GORHAM BACON.

NOSE AND NASO-PHARYNX.

332. SUCHANNEK, H., Zuerich. General pathology and pathological anatomy of the nose, pharynx, larynx, and trachea. Reprinted from *Results of General Pathology and Pathological Anatomy of Man and Animals.* J. F. Bergmann, Wiesbaden, publisher.

333. FRAENKEL, B. On railway-coryza. *Arch. f. Laryngol.,* iii., 3.

334. SCHECH, PH., Munich. Nasal asthma and its relations to emphysema. *Muench. med. Wochenschr.,* No. 33, 1896.

335. Bayer. Glycosuria of nasal origin. *Ann. de l'instit. chirurg.*, Brussels, 1896.

336. Abel, R., Greifswald. On the etiology of ozæna. *Zeitschrift für Hygiene und Infections Krank.*, vol. xxi., p. 89.

337. Dreyfuss, Strassburg. On the bacteriology of ozæna. *Naturforscherversammlung*, 1896, *Section für Laryngologie.*

338. Bayer, Brussels. On ozæna, its etiology and treatment with electrolysis. *Muench. med. Wochenschr.*, Nos. 32, 33, 1896.

339. Ertler, M., Vienna. Contributions to the treatment of diseases of the nose and pharynx. *Wien. med. Presse*, No. 31, 1896.

340. Dunn, John, Richmond. On the growth of aspergillus glaucus in the human nose. These Archives, German edition, vol. xxix., p. 95.

341. Herck. Remarks on abscesses of the nasal septum. *Arch. internat. de laryng.*, etc., No. 4, 1896.

342. Ripault. Bilateral exostoses in the nose through hereditary syphilis. *Ann. des mal. de l'or.*, etc., Sept., 1896.

343. Stieda, Alfred. On bony cysts in the nose. From the aural and laryngeal policlinic of Prof. Koerner and from the pathological institute of Rostock. *Arch. f. Laryng.*, iii., 3.

344. Demonstration of a rhinolith of phosphate of calcium around a cherry stone. *Rev. hebdom. de laryng., d'otol.*, Aug., 1896.

345. Killian, Prof., Freiburg. The exploratory puncture of the accessory cavities of the nose. *Muench. med. Wochenschr.*, No. 31, 1896.

346. Winckler, Bremen. On the treatment of affections of the accessory cavities of the nose. *Arch. f. Laryng.*, iii., 3.

347. Bois, Raphael. Study on fistula of the frontal sinus. *Archives générales de médecine*, July–Sept., 1896.

348. Claoné, R. Diagnosis and treatment of ethmoidal empyema. *Rev. hebdom. de laryng.*, etc., Aug., 1896.

349. Hellmann, Wurzburg. Syphilitic (?) caries of the ethmoid bone. Curettement. Death from cerebral apoplexy in connection with the operation. *Arch. für Laryngologie*, vol. iii., p. 210.

350. Jacquemart. On a case of severe naso-pharyngeal catarrh. *Rev. hebdom. de laryng., d'otol.*, Sept., 1896.

351. **Brindel.** Histological examination of sixty-four cases of adenoid vegetations. *Rev. hebd.*, Aug , 1896.

352. **Gottstein, Georg.** Pharyngeal and palatine tonsils as the primary seats of tubercular infection. *Ber. Klin. Wochenschr.*, No. 31, 1896.

353. **Monnier.** Rare pharyngeal localizations in hereditary syphilis tarda. *Ann. des mal. de l'or.*, etc., Aug., 1896.

354. **Breitung, Max**, Coburg. Contributions to the prophylactic treatment of diphtheria. *Deutsche med. Zeitung*, No. 57, 1896.

355. **Friedland, Franz**, Prag. On 3 cases of hyperkeratosis lacunaris (Siebenmann) of the tongue.

356. **Killian, J.**, Worms. Treatment of phlegmonous angina and peritonsillitis abscedens. *Muench. med. Wochenschrift*, No. 30, 1896.

357. **Gruenwald, L.**, Munich. Treatment of phlegmonous angina and peritonsillitis abscedens. *Muench. med. Wochenschr.*, No. 38, 1896.

358. **Mingrazzini.** Clinical and anatomical observations on hemiatrophia linguæ. *Archives ital. di Otologia*, etc., iv., 1896.

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361. **Coolidge, Jr., A.** The control of hemorrhage in some operations in the nose and throat. *N. Y. Med. Jour.*, Sept. 12, 1896.

362. **Mackenzie, G. Hunter.** A case of diffuse papillomatous degeneration of the nasal mucous membrane. *Lancet*, August 15, 1896.

363. **Douglass, Beaman.** Primary carcinoma of inferior turbinated body. *Medical Record*, August 8, 1896.

364. **Black, G. Melville.** Nasal sarcoma cured by operation. *N. Y. Med. Jour.*, August 15, 1896.

365. **Bliss, Arthur Ames.** Two cases of sarcoma of the nasal chambers and accessory sinuses. *N. Y. Med. Jour.*, July 25, 1896.

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368. Gillette, Arthur J. Torticollis due to adenoid vegetations and chronic hypertrophy of the tonsils. *N. Y. Med. Jour.*, August 1, 1896.

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376. Nichols, J. E. H. The sequalæ of syphilis in the pharynx and their treatment. *N. Y. Med. Jour.*, Sept. 26, 1896.

377. Kelly, A. B. Mycosis pharyngis leptothricia and keratosis pharyngis. *Glasgow Medical Journal*, August, 1896.

378. Griffin, F. Harrison. Two cases of an enlarged ascending pharyngeal artery situated on the posterior wall of the pharynx. *Medical Record*, August 15, 1896.

379. Bottome, F. A. Secondary hemorrhage following tonsillotomy. *Med. Rec.*, August 29, 1896.

380. Swain, H. L. Acute disease of the lingual tonsil. *N. Y. Med. Jour.*, July 25, 1896.

381. Washburn, W. A case of glossitis. *Medical Record*, August 1, 1896.

382. Freudenthal, W. A nasal bag. *Medical Record*, July 11, 1896.

383. **Gradle, Henry.** A handy form of hot snare for tonsillotomy. *Jour. Amer. Med. Ass'n*, Sept. 26, 1896.

384. **Rankin, D. N.** A case of gunshot wound of the pharynx. *N. Y. Med. Jour.*, Sept. 12, 1896.

385. **Schadle, J. E.** New snare for post-nasal and intranasal surgical operations. *Medical Record*, July 25, 1896.

386. **Straw, J. R.** A new self-retaining nasal speculum. *Jour. Amer. Med. Ass'n*, Sept. 19, 1896.

387. **Smith, J. Lewis.** Acute naso-pharyngeal inflammation. *Medical News*, August 29, 1896.

332. **Suchannek's** general pathology and pathological anatomy of the nose, etc., which is based on extensive experience of his own and careful compilation of the latest literature, shows thorough knowledge of this field and good judgment. It would be too far to go into the details of the work. Whoever wants to inform himself on this subject will find the book very useful.

. H.

333. **Fraenkel** uses the term *railway coryza* for a special form of nervous coryza in predisposed individuals, which is brought about by particles of dust and coal entering the nose while travelling on railway trains. F. recommends injections of solutions of nitrate of silver ¼ to 1 per mille and prophylactic insertion of cotton into the nostrils. Zarniko.

334. **Schech** thinks that only repeated attacks of nasal asthma, lasting for years, lead to emphysema (in the anatomical sense) in older people, while in younger individuals even after many years a restitution is possible. Regular asthma, due to bronchial spasms, occurs rarely in persons suffering from emphysema with an emphysematous chest and bronchitic symptoms. Their dyspnœa is generally caused by bodily exertions, coughing spells, particularly by bronchitis, or partly a consequence of a weakened heart.

Schech refers to some peculiarities of nasal asthma : bronchial spasm on one side (he observed 2 cases in which only the lung corresponding to the diseased side of the nose was affected), the occurrence of larvated forms (as chronic bronchitis with slight difficulty of breathing), which seem to be of neurotic character, since they disappear after nasal operations or change of climate.

Mueller.

335. Coincidence of diabetes and intense hypertrophic rhinitis in a man, aged forty-five. The hypertrophic mucous membrane

was treated with menthol-vasogene, dietetics and Kissingen water besides. The nasal stenosis and diabetes subsided entirely. A relapse of both after a year was cured by the same treatment. BAYER does not doubt the dependence of diabetes upon the nasal stenosis, and explains it by insufficient oxydation of the glycose or by reflex irritation of the nervous centres, particularly the medulla oblongata, due to insufficient nasal breathing.

ZIMMERMANN.

336. ABEL gives the results of the most minute bacteriological examination of ozæna. Without knowledge of previous investigations he came to the same conclusion as Löwenberg, that the micro-organism discovered by the latter is the agent of ozæna. Abel gives a picture of the disease and discusses the various theories on the origin of ozæna. He considers Zaufal's theory as refuted, who attributes the disposition to ozæna to an abnormal width of the nasal meatus from atrophy of the turbinated bodies, since ozæna also develops in very narrow nasal meatus. (This is not correct, in the reviewer's opinion. Ozæna is never observed in very narrow nasal passages.) "The formation of a peculiar muco-purulent secretion drying rapidly to crusts" is the characteristic never-wanting attribute of ozæna. Abel concludes from his examination of 100 cases decidedly that *ozæna is an infectious disease produced by the ozæna bacillus.* The secretions of ozæna contain various organisms, but always more or less numerous ozæna bacilli, characterized by a certain size, *clumsy rods with capsule*, sometimes shorter, sometimes longer. They are easily stained with the common staining fluids, but not according to Gram's method. Abel calls them *bacillus mucosus ozænæ*, on account of the mucus formed in cultures. Greyish-green hemispheric prominences develop on the surface, but the gelatine is not liquefied. For culture agar is especially useful, after 12 to 24 hours, on which confluent colonies grow with a tendency to spread toward the bottom (at a temperature of 39° C.). The ozæna bacillus does not move and never has spores. Mice inoculated with it died after 1 to 4 days. In each case in which the diagnosis ozæna was made, ozæna bacilli were found in the secretion, or in the secretion of the middle ear, when perforations of the *Mt* co-existed, in the secretion of the conjunctiva in simultaneous conjunctivitis. In cases which had recovered the bacilli were wanting. The ozæna bacillus is not found without ozæna in the nose. In a case (of phthisis *in extremis*) Abel produced the

first stages of ozæna by inoculation of a culture of the ozœna bacillus in a healthy nose and thus proved its etiological value.

H.

337. **Dreyfuss** reports his investigation, in conjunction with **Klemperer**, in regard to the specific nature of the ozæna bacillus of Löwenberg-Abel.

They first postulate a proof beyond doubt that the ozæna bacillus of Abel is not identical with the pneumo-bacillus of Friedländer, which not rarely inhabits the healthy and diseased nasal cavity (although not as frequently as hitherto supposed). The difference of both in morphology, cultures, and virulence are not so constant, according to Dreyfuss and Klemperer, and not so striking as to allow a clear distinction.

One point would be determinating, viz., the negative or positive test of immunity, which, however, could not be definitely ascertained by Dreyfuss and Klemperer. They decidedly negate the infectiousness of the ozæna bacillus, *i. e.*, its faculty to produce ozæna when brought on a healthy human nasal mucous membrane, as supposed by Abel from an experiment on a phthisical patient, which is not at all unobjectionable.

The *résumé* is: In ozæna almost regularly a bacillus is found, which occurs relatively rarely in the healthy nose or in other nasal diseases. Bacteriologically it cannot be sharply discriminated from the pneumo-bacillus of Friedländer. The small differences may be due to its growth on a special nutrient soil, *i. e.*, the nose affected with ozæna. This bacillus does not create any changes when brought on healthy or atrophic nasal membranes. It is not the cause of the odor. It may produce suppuration (Abel's experiment). It is rather improbable that it may cause atrophy, since it does not invade the tissue itself. Therefore neither this nor one of the other micro-organisms generally associated with it are to be considered as the causes of ozæna.

Antoref.

338. Etiology and treatment of ozæna are discussed by **Bayer** from a perfectly novel point of view. At the instance of proclamations of a cure of ozæna in *one* sitting by "interstitial cupric electrolysis" (according to Gautier), as published by several Belgic laryngologists and otologists, Bayer tried this method with astonishing results. The procedure, however, is not without danger, as has been claimed. A sitting of 10 to 15 minutes, and a current of not more than 15 MA, frequently sufficed. The

copper needle was pierced into the middle turbinated body, the platinum needle into the base of the septum or the lower portion of the lateral nasal wall. Within a few days the odor and formation of crusts ceased, and only a moderate chronic catarrh remained. Bayer illustrates this with 7 clinical histories (in 4 of which the improvement was found persistent after 3 months).

Bayer explains the effect from changes in the nutrition of the tissues pervaded by the current, as the chemical and microbicide action of the electric current cannot possibly extend over such a large field (other side, naso-pharynx, and pharynx). If it destroyed the microbes which produce the odor, the latter would disappear at once ; but this is not the case. Bayer surmises that the current acts on the nervous elements of the sensory nasal wall, and elicits a reflex "tropho-motor impulse" to a normal secretion unfavorable to the growth of micro-organisms. Thus, in his opinion, ozæna is a tropho-neurosis, *i. e.*, an anamoly of secretion, furnishing an excellent nutrient material for a specific microbe, which produces the odor. Ozæna consists, according to Bayer, in a disturbance of nutrition of the mucous membrane, leading to hypertrophic rhinitis from irritation (as if through a foreign body), and ending in atrophy. Electrolysis is the best and almost specific treatment of ozæna. MUELLER.

339. ERTLER saw very good results from the treatment of ozæna with injections of 2 to 5 per cent. solutions of ichthyol through the nose, and mopping the pharynx with them in pharyngitis. POLLAK.

341. HERCK recommends opening the abscesses of the septum at the lower pole. ZIMMERMANN.

342. An obstruction of the nose of a boy, aged thirteen, for two years, had become total within the last four months. The frontal processes of both upper jaws showed symmetrical hard protuberances. The nasal passages, from the anterior opening to the choanæ, were stopped by hard flat tumors, immovable, which could not be circumscribed by the probe. After the nose was opened and reflected, the external exostoses were found to be in connection with those in the nose. A tunnel was made with the chisel up to the choanæ with considerable improvement, still noticeable after six weeks. RIPAULT does not say from which bone the exostoses started, and whether remnants of the turbinated bodies were left. The antrum Highmori was not affected.

ZIMMERMANN.

343. After a compilation of the incident literature, STIEDA reports two cases of osseous cysts, which he observed in Körner's policlinic. The first case was a girl of sixteen years, with a bony cyst starting from the right middle turbinated body, of the size of a hen's egg, communicating with another cyst as large as a cherry stone, situated on the first. After removal (with conchotome and galvano-cautery snare) the cysts were found to be filled with pus, and their inner lining membrane was the seat of a few polyps of the size of a pea. Microscopically the lining (mucous) membrane showed ciliated and partly pavement epithelium, but no mucous glands. The bony stratum was covered by numerous osteoblasts; on some places were osteoblasts in Howship's lacunæ. The second case was that of a woman, nineteen years old, who came on account of nervous trouble (intense headache, difficulty of breathing, etc.). The left middle turbinated body was bulged out in front in form of a cyst. Removal of the cyst with the conchotome gave no relief. Microscopically: No mucous glands, mucous membrane partly œdematous. Arterial walls thickened. Thin stratum of osteoblasts, on some points signs of absorption.

Stieda reached the conclusion, from his investigations, that the osseous cysts are due to an extension of congenitally predisposed cells. The extension is caused by inflammation of the mucous membrane and the periosteum. ZARNIKO.

344. A rhinolith was found in the posterior third of the middle nasal meatus of a woman, aged fifty-four. Perhaps it had entered the nose in a coughing spell while the patient was swallowing. ZIMMERMANN.

345. The favorable results of explorative punctures of the maxillary antrum (for which KILLIAN recommends the method of Hartmann, viz., to enter the antrum from the centre of the middle nasal meatus) led Killian to analogous experiments on other nasal sinus (first on specimens). Puncture of the sphenoidal sinus is relatively simple, that of the ethmoidal cells more difficult. According to Killian they may be approached from the olfactory region above a line drawn from the upper margin of the choanæ to the insertion of the middle turbinated body, or if it should be too narrow, from the middle meatus vertically upwards from the turning point of the middle turbinated body. In the first case he uses a pointed canula with a short lateral bent, in the second case the same but with a rectangular bent upwards. The

bents must be very short, to avoid injuries of the orbit or cranial cavity. The frontal sinus is the least approachable. An *ultimum refugium* is the removal of the anterior portion of the middle turbinated body, which generally opens the way for the canula. Killian finally emphasizes that this operation requires exact knowledge of the anatomy and previous experiments on specimens. MUELLER.

346. WINCKLER gives his *latest standpoint* in regard to the accessory cavities, after a few polemic remarks against Schech, as to the latter's critics of Schaeffer's method of opening the frontal sinus, advocated by Winckler. Winckler *discards any intra-nasal treatment of empyema of the frontal or maxillary sinus*. He operates on the maxillary antrum according to Jansen, and on the frontal sinus according to Kuhnt. If there is no offensive secretion, and if the case is not urgent, he adopts a palliative treatment through removal of the swelling of the nasal mucous membrane (astringents, weak solution of nitrate of silver, cocaine, ointments), or, in atrophy and formation of crusts, through stimulation of secretion (Gottstein's tampons with balsam Peru, glycerine āā, or with europhene oil and irrigation). If he does not succeed he irrigates after establishing a counter-opening, or makes a large opening. *Endo-nasal operations* generally were sufficient in *ethmoidal diseases* and *empyema of the sphenoidal sinus*. ZARNIKO.

347. A detailed discussion in regard to etiology, pathology, diagnosis, and treatment, and a collection of 36 cases from literature. BOIS recommends as the only rational treatment of fistulæ from inflammation of the frontal sinus the wide opening of the frontal sinus through removal of the anterior or inferior wall, or both (according to topographical conditions), followed by curettement of the sinus. He lays especial stress on effecting a free communication with the nasal cavity (if necessary, with perforation of the anterior ethmoidal cells) and drainage. For this the catheter of Panas is very handy, which can be easily carried from the opened sinus through the nose out of the nostril. Then a drain is attached to it, and with the retraction of the catheter drawn into the frontal sinus. If the drainage towards the nose is sufficient, Bois recommends primary suture of the external wound, effecting a cure within three to six weeks. HAENEL.

348. CLAONÉ registers the classification of ethmoidal diseases of Bosworth, Gruenwald, and Baumgarten, and mentions his dis-

tinctions: (1) Empyema with orbital symptoms, (2) latent empyema without external symptoms, (3) encysted empyema. All may primarily or secondarily be associated with caries and polypi. The following discussion contains nothing new, and is nothing but a repetition of diagnostic and operative methods already published. ZIMMERMANN.

349. A woman, æt. fifty, had lues, when twenty years old, for which she underwent several inunction cures. For fifteen years headache and formation of offensive crusts in the nose.

HELLMANN found the root of the nose of a very decrepid patient, who had emphysema of the lungs, tender on pressure (on the right side), the right middle nasal meatus filled with granulations and pus, and atrophy of the nasal bones. Exploratory puncture evacuated tough, not offensive, pus from the right Highmore's antrum. Hellmann scraped the granulations with the sharp spoon; some decayed pieces of bone came away and offensive pus from a cell in the middle turbinated body. After a few days, aphasia, paralysis of right arm and leg, œdema of the eyelids and of the region behind the right ear. Death forty-four days after operation.

The post-mortem examination showed that death was not due to the operation. The lamina cribrosa was intact, as well as the meninges and sinus. Numerous capillary apoplexies in the brain, hypertrophy of the heart, emphysema of the lungs.

ZARNIKO.

350. Very "detailed" clinical history of a severe case of chronic hypertrophic rhinitis, with all direct and indirect sequelæ, exuberant adenoid vegetations in naso-pharynx, and synechiæ between turbinated bodies and septum, from galvano-caustic operations. The synechiæ were severed with the galvano-cautery in twenty sittings (one every other day), and the naso-pharynx cleared, at least partly, with the hot snare. After an intermission of six weeks, the same picture; the synechiæ only had not returned. Again the galvano-cautery was used, until the adenoid vegetations could be seen from the front. They were scraped from the nose. Rough concretions, hard as stone, were felt, which probably had been formed from the secretions, and had secondarily caused the adenoid vegetations. They could only be loosened, as the patient was very timid, but under irrigations perfect relief was obtained, which Jacquemart observed even after three months and later. What became of the concretions is not mentioned. ZIMMERMANN.

351. From the observation of 64 cases of adenoid vegetations, BRINDEL denies their rare occurrence in adults. They do not show an arrest of development, nor disappear by shrinkage. In 25 cases normal ciliated epithelium was found in different degree of development and extent into the depth, in 25 cases the superficial cells were flattened, in 14 also the cells in the crypts, independent upon age. Only in 7 mucous glands were found in the depth, near or within the fibrous basement tissue. From this Brindel concludes that the lymphoid tissue commences to grow immediately under the epithelium, which explains the want of formation of cicatricial tissue after curettement. The consequence of atrophy of the mucous glands by compression is the lack of mucous secretion, which has a bactericidal action, and that the tissue is exposed to infection. Brindel found only in 19 cases connective tissue of any amount, in 24 none at all, and in 21 the follicles were prevalent. The age is without influence upon these conditions, except that the vegetations are rather soft in adults. In the cases with more developed connective tissue the walls of the blood-vessels were thickened, and in 22 very marked, in 9 partially, in 33 not at all. One case, in which a profuse hemorrhage occurred five days after the operation, showed indarteritis in many places. One case had been treated with irrigations of resorcin (50-per-cent. solution) and then was operated on. Not a trace of regressive metamorphosis was found, which might have been attributed to the action of resorcin. In 10 per cent. of all the examined cases a "latent encysted lacunar adenoitis" was observed; detritus of epidermis and micro-organisms in a cyst lined with membranes of various thickness, or cylindrical epithelium, which probably had formed through superficial concrescence of the lacunar openings. In 8 cases Brindel reports to have found tuberculous cheesy foci with giant cells, in 1 with three bacilli. This would be more credible if the condition had been described more precisely. Bacteriological controlling tests were not made.

ZIMMERMANN.

352. GOTTSTEIN discusses 6 observations of primary tuberculosis of the pharyngeal and palatine tonsils; 3 cases out of 5 from Stoerk's policlinic, with tuberculosis of the hyperplastic pharyngeal tonsil, 1 with tuberculosis palatine tonsil and 1 with combined tuberculosis of pharyngeal and palatine tonsils. The sixth case was from the policlinic of Gottstein's father; six

years after the operation of adenoid vegetations, in which tubercles were found, the child was in splendid health. None of the cases examined presented clinically the least signs of tuberculosis. All excised pharyngeal tonsils (33 with 12% tuberculosis) and palatine tonsils (20 with 10% tuberculosis) were systematically examined. Microscopically, only tubercles, no cheesy degeneration nor tubercle bacilli, were found. Therefore, from a bacteriological standpoint, the tuberculosis cannot be acknowledged. (Reviewer.) To avoid propagation of infection in all cases of hyperplastic pharyngeal and palatine tonsils operation is advised.
H.

353. MONNIER saw as the only signs of lues in 3 young girls an ulcerating gumma of the posterior wall of the pharynx. This localization is not rare. ZIMMERMANN.

354. BREITUNG recommends removal of adenoid vegetations, irrigations of the naso-pharynx, slitting and removal of the tonsils with the conchotome as prophylactic measure against diphtheria.
H.

355. With reference to the corresponding paper of Siebenmann (*Arch. f. Laryngol. und Rhinol.*, 1895, vol. ii.), FRIEDLAND reports 3 cases of hyperkeratosis of the lingual crypts, in one case also of the palatine tonsils (pharyngomycosis leptothricia, mycosis benigna). Friedland considers with Siebenmann, the abnormal keratosis of the epithelium as the essential character of these formations, which are 1 to 3 *mm* long and project like strings from the lingual crypts or tonsils. The occurrence of leptothrix on the surface of the strings seems to him of minor importance. Leptothrix was never found in the deeper corneal strata, nor in the epithelium of the walls of the crypts, and there never was any inflammatory infiltration around. The microscopical condition found by Friedland is almost the same as described by Siebenmann. Friedland, however, observed marked flattening of the papillæ of the mucous membrane of the crypts and an attenuation of the epithelium layer of the crypts, which was not keratosed, in comparison to the epithelium on the open surface. HAENEL.

356. KILLIAN frequently observed that the safest and easiest way to reach peritonsillitic abscesses is from the fossa supratonsillaris (laterally and above the tonsil). A thick probe is introduced at this place and carried laterally and upwards, until pus oozes along the probe. Now a closed forceps is inserted and by

opening it the canal widened from above downwards. This is repeated in the following days. . The advantage with timid patients is, that no cutting instrument is used.

MUELLER.

357. In this short article GRUENWALD warmly endorses Killian's method (see above), which he employed most successfully for some time. The pursued road corresponds exactly to the way of infection and reaches the point in the safest manner. If an abscess is not encountered from the fossa supratonsillaris it shows that it does not originate in the tonsil. This is illustrated by a case in which the typical picture of a peritonsillitic abscess was presented by a suppuration caused by the carious third inferior molar tooth.

MUELLER.

358. MINGRAZZINI collected from literature the few cases of hemiatrophy of the tongue, and reports an observation of his own with histological examination of the nervous centres. The condition is illustrated by numerous pictures. GRADENIGO.

359. In the Ophthalmological Section of the British Medical Association meeting, MAXWELL stated that patients complaining of accommodative asthenopia frequently suffer from nasal obstruction and catarrhal deafness, the eye symptoms being relieved after nasal treatment. He suggested a reflex nervous explanation, the afferent impulse travelling by the fifth nerve, the efferent by the long ciliary, stimulation of which not only dilated the pupil but lessened or abolished accommodation. Rayner Batten, who took part in the discussion, suggested a vascular explanation, for on compressing the nostrils and attempting to expire with the mouth closed, the far point approaches, the eye becoming virtually myopic, and if an effort at inspiration is made under similar circumstances, the near point recedes, the eye becoming temporarily presbyopic ; these results he attributed to the emptying and filling of the ciliary body. Batten also called attention to the presence of a staphyloma on the nasal side of the disk in many cases of nasal affection ; the disk itself being also tilted towards the nasal side. CHEATLE.

360. Excision of the surface tissue of the vestibule causes contraction. In partial stenosis, due to deflections of the anterior part of the triangular cartilage with or without thickening of the convex side, MYLES removes the lower portion of the cartilage submucously and unites the incision by minute silk sutures.

M. TOEPLITZ.

361. COOLIDGE discusses the different positions for operations of the naso-pharynx and mouth. Bleeding is not to be stopped by styptics. The amount of bleeding depends more upon the possibility of retraction of the vessels. The control of bleeding by posterior plugging and compression respectively is illustrated by the report of two cases of secondary bleeding after removal of the pharyngeal and faucial tonsil. Posterior plugging should be prophylactically prepared before removal of naso-pharyngeal fibromata. M. TOEPLITZ.

362. HUNTER MACKENZIE found the nasal mucous membrane in both nostrils of a man, aged thirty, studded throughout by numerous senile growths varying in size "from a pin's head to almost a grain of rice," being most abundant on and about the upper regions, both nostrils equally affected. Removal was effected by means of the cold snare and the nasal curette. No recurrence after four months. Microscopical examination showed them to be papillomatous. A photo-micrograph is given. CHEATLE.

363. The patient of DOUGLASS, aged thirty-one, suffered for five years from discharge of the left nostril, epistaxis, occasional pain and swelling, which increased of late, so as to obstruct the tear duct. The left inferior turbinated body seemed atrophied, and was superficially ulcerated to the extent of an inch. Removed portions of the tumor showed microscopically all the characters of carcinoma. This is the only case of carcinoma on record that began in the turbinated tissues. The antrum Highmori was not involved. M. TOEPLITZ.

364. BLACK's patient, a female, aged thirty-eight, suffered from rapid occlusion of the right nostril, occasional hemorrhage, frontal headaches, elevation of temperature to 101°, and external enlargement of the nose. The tumor extended into the posterior nares. It was removed under ether with snare and curette. It was an inch and a half long, three quarters of an inch wide, and one inch high. A smaller piece and granulations were removed at two subsequent sittings with cold snare and curette, and the base was cauterized with trichloracetic acid. There has been no return these two years. The microscopical examinations revealed the tumor to be an alveolar sarcoma.

M. TOEPLITZ.

365. BLISS reports the cases of two brothers, aged four and nine respectively, both with tumors in the left nostrils, and exophthalmia. The younger brother had been more than thirty

times operated upon by means of the forceps, with recurrence of the tumors after every operation. The naso-pharynx and the left external auditory meatus were also filled with the masses. There was tenderness over the left maxillary antrum with involvement of the cervical lymphatics. Bliss exposed the canine fossa, opened and cleared the antrum, broke down its inner wall, removed the tissues within the anterior nares, including the middle and lower turbinated bodies, and also the masses from the post-nasal space. The exophthalmia was not reduced by operation. The cervical glands became greatly involved during the six weeks after the operation. Difficulty of respiration apparently of central origin set in, and the child died about three months after the operation. No autopsy. No description of microscopical examination.—The older brother was not operated upon.—The reviewer does not agree with the view of Bliss of the origin of the growth in the middle turbinated body or ethmoid sinus, but believes that the tumor belongs to the vascular tumors originating in the naso-pharynx and rapidly spreading into all cavities of the head, which have been excellently described by Bensch in his classical monograph published by Morgenstern, Breslau.

M. TOEPLITZ.

366. BOYLAN's male patient, æt. forty-five, suffered for a year from severe epistaxis, stoppage of left nostril, and acute headaches. The brown-red tumor extended from the anterior to the posterior nares, and originated from the lateral wall. It was removed at two sittings with wire loop and flat forceps, and its base curetted. It was of the size of a hen's egg, and had its attachment over one inch and a half along the lower turbinal. The microscopical examination proved it to be a spindle-celled sarcoma. There has been no recurrence for two years after the operation. Boylan concludes, from the twenty-one cases taken from literature since Bosworth's tabulation of forty-two cases, that prompt radical operation is indicated wherever there is a chance of removing the growth completely, principally in smaller tumors.

M. TOEPLITZ.

367. WAGNER reports a case of empyema of the antrum, which occurred in a carriage painter, aged thirty-two, who had suffered for three years from severe neuralgia of the right supraorbital region. The crusts over the hiatus semilunaris contained the staphylococcus aureus. The antrum was opened with a spearhead drill through the hard palate under cocaine, and shortly

after through the canine fossa under chloroform with a large trephine drill. The tissue removed from the antrum yielded the characteristic lead reaction with sulphide of sodium. The patient made an excellent recovery under iodide treatment.

M. TOEPLITZ.

368. GILLETTE reports three cases of wryneck connected with adenoids and hypertrophied tonsils. In the first case, that of a boy aged seven, the torticollis was congenital and the child a mouth breather from infancy. The removal of the adenoids improved the wryneck somewhat, which was finally cured by division of the sternocleido-mastoid muscle and orthopedic measures. In the second case, of a baby, aged sixteen months, the congenital wryneck was also improved after removal of adenoids, but not cured. The third case occurred in a rhachitic child, æt. three, in whom the torticollis appeared at that age after a cold, lasted six weeks, and was completely cured after operation of adenoids.

M. TOEPLITZ.

369. HARDIE arrived at the following conclusions: Adenoid vegetations should be removed in young children under general anæsthesia. Cocaine and the cold wire snare is used in older children. The nitrous oxide anæsthesia is too brief. Ethyl bromide is more desirable, but not well taken by nervous children. Ether is to be substituted in prolonged operations. Gottstein's curette is the most satisfactory single instrument, particularly in operations under bromide of ethyl.

M. TOEPLITZ.

370. SHIELDS' *Case* 1 occurred in a young man, aged twenty-three, originated with broad base from the basilar process and was adherent to posterior pharyngeal wall, sending a large projection into the left and a small one into the right nasal cavity. It was removed by a wire loop placed around the tumor which made a cut into it, but broke, and finally a galvano-cautery loop and the remaining projections with the hot snare. Fourteen months later, a small growth, of the size of a grain of corn, was removed from the left nostril and a thickening at the roof of the pharynx was reduced by the cautery. The tumor was a vascular fibroma of the type described by Bensch. *Case* 2 is of great interest, on account of its occurrence in a negro woman over forty-eight years old, the only case ever observed in the negro race. Galvano-cautery without preliminary operations is best suited for these cases.

M. TOEPLITZ.

371. INGALS found the right nostril of a boy, aged eleven, completely occluded by a reddish growth at its posterior third, and the naso-pharynx filled by a firm tumor measuring, upon removal, 1, 1½, 2⅛ inches. The right cheek was abnormally full and thickened posteriorly beneath the zygomatic arch. The tumor was gradually cut through with the galvano-cautery écraseur. The swelling of the cheek due to a projection of the growth behind the palate bone and out beneath the zygomatic arch, measuring from 2 to 3 *cm* in diameter, was treated through the mouth with injections of lactic acid of from 15 to 35 per cent., combined with 5 per cent. of carbolic acid after injections of weak solutions of cocaine. The tumor was thus reduced in ten months by fully nine-tenths of its size. M. TOEPLITZ.

372. HUBBARD's patient, a man, of about fifty years of age, suffered from excoriations caused by the posterior edge of upper dental plate and the development of a flat tabular tumor, of the size of a nickel piece, situated on the right side partly in the soft palate, partly in the anterior pillar of the fauces. Dr. Jonathan Wright found it to have been distinctly an epithelioma. Injections of liquor potassæ, a portion of a drop at a time, were administered to the growth, with the result of formation of a cicatrix and rapid improvement of patient without return of tumor. The patient died after twenty months from a combination of heart and renal disease. M. TOEPLITZ.

373. Among the three cases of PORTER the first two have been published before (*Archives of Laryngology*, 1880); the third one occurred in the pharynx and naso-pharynx of a young man. The turbinals were acutely inflamed during the previous week, followed by erysipelas of the external surface of the nose which extended down the neck. The right Eustachian tube and middle ear became involved. The larynx was free. The patient made a good recovery. M. TOEPLITZ.

374. CHAPPELL reports three histories, one of primary, two of secondary tuberculosis of the pharynx. The latter occurred in young men, twenty-four and twenty-five years of age respectively. In both, the larynx was affected before the pharynx, which six and four weeks, respectively, before death began to thicken at the lower part of the right posterior pillar, soft palate and uvula. Yellow spots then appeared on the pillar (illustrated by a drawing) which ulcerated, coalesced and poured out much thick secretion. The third case occurred in a girl, aged nineteen, who,

in September 1895, presented post-nasal discharge, acute swelling of pharyngeal tonsil, and discharge from right ear. The adenoids were removed at different sittings within ten days, but, a week after removal, chills and pain behind palate set in. The mucous membrane of the naso-pharynx looked irregular and puffy, resembling adenoids. These masses, when removed, appeared hard. Three weeks later the glands and the lateral folds of the right side began to swell. The lungs were at this time normal. The patient's sister had suffered from an acute pulmonary affection, and had occupied the same room and bed. The mucus from pharynx and naso-pharynx contained tubercle bacilli. Pieces of tissue cut from lateral fold and from naso-pharynx were examined by Dr. Jonathan Wright, who diagnosed the condition as miliary tubercle of lymphoid tissue. The two guinea-pigs inoculated with the tissue by Dr. W. H. Park, presented disseminated tuberculosis. In January, 1896, the pharyngeal thickenings spread upward to soft palate and downward to the larynx. Four months only, from the time the infection of the pharynx was recognized, the apex of the right lung was first noticed to be affected, three days later, also the left one. The tuberculosis now became acute and the patient died during the last week of March, 1896.

M. TOEPLITZ.

375. WRIGHT examined about sixty tonsils and adenoids for evidences of tuberculosis and stained 28 sections of these with Ziehl solution, but with negative result. He repeats Dieulafoy's experiments by making five inoculations into the peritoneal cavity and subcutaneous tissues of guinea-pigs with faucial tonsils and seven with adenoids, without producing tuberculosis, while inoculations with pieces taken from Dr. Chappell's patient[1] resulted in infecting the animals. Wright assumes with Botey the existence of primary tuberculosis in hypertrophied tonsils, without pulmonary lesions. Two pictures, one illustrating the manner in which a veritable stream of tubercle bacilli pours through the thickened laryngeal epithelium without the presence of ulcers, another representing the miliary tubercle, are appended.

M. TOEPLITZ.

376. Adhesions between the soft palate and the posterior pharyngeal wall are operated by NICHOLS, similarly to the operation for webbed fingers, by trying to allow a braid, placed into the scar by means of a curved needle, to be left in position for

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[1] *Cf.* this report, Chappell, W. T., *Primary and Secondary Tuberculosis of the Pharynx.*

several weeks. Through the thus newly-formed cicatricial canal a right-angled knife is pushed, and the cut edges will remain separate. The operation may have to be repeated several times.

M. Toeplitz.

377. In an interesting paper **Kelly** brings forward further proof of Liebermann's statement, that the disease known as mycosis leptothricia is in reality a keratosis; but he maintains that this keratosis is more extensive than Liebermann thinks, and suggests the name keratosis pharyngis in the place of hyperkeratosis lacunaris. He points out that a condition does exist which may be termed mycosis pharyngis leptothricia, but which is quite distinct from the affection which at present bears that name.

Cheatle.

378. **Griffin** observed the abnormal location of the pharyngeal artery (1) in a woman, aged forty-nine, with large syphilitic pharyngeal scars, situated on the right side, of the size of a lead pencil, extending to the median line and one inch and a half downward; (2) in a woman, æt. forty-nine, situated on the left side, about a quarter of an inch inside the posterior pillar, of the same size, extending above the margin of the soft palate and as far down as it could be seen by depressing the tongue.

M. Toeplitz.

379. During the removal of the left tonsil of **Bottome**'s patient, a male, aged thirty-one, the blade of the Mathieu tonsillotome broke off; the tonsil was finally amputated with a Mackenzie tonsillotome without considerable hemorrhage. The right tonsil, of the same hard variety as the left, was removed two days later; a severe hemorrhage, however, occurred sixty-six hours after the operation, which was stopped with difficulty by the cautery and tannin. M. Toeplitz.

380. **Swain** dwells upon the rareness of acute disease of the lingual tonsil against the frequency of the chronic form, and upon the scarcity of recorded cases. He has, however, of late found the acute cases much more frequent. After a full description of the macroscopical anatomy of the lingual tonsil, he emphasizes the difference between the faucial and lingual tonsils and their affections. Swain distinguishes four forms of acute disease of the lingual tonsil: (1) The simple inflammation of the chronic hypertrophy; (2) the follicular, following that of the faucial; (3) the circumtonsillar, occasionally resulting in abscess; and (4) the diphtheritic. Among all the symptoms, such as

feeling of a lump, difficulty of swallowing, pain extending into the ears, the cough is the most persistent one. In the follicular form there is more fever, and the local symptoms are more pronounced, but the decline is more rapid, notwithstanding a tendency to relapse. The peritonsillar cases are much severer, the surrounding parts show more swelling, which may be absorbed, open spontaneously or by lancing. The treatment is antiphlogistic and antiseptic by Priessnitz, ice, gargles, and sprays, and, in phlegmonous cases, by steam inhalations. Applications of glycerite of boro-glyceride and subsequent inflations of tannin containing 2½ per cent. of morphine, scarifications, leeches to hyoid region, cocaine before taking nourishment, are used. Swain concludes with a full report of a case of abscess of the lingual tonsil. M. TOEPLITZ.

381. WASHBURN's male patient, aged forty-five, after an attack of tonsillitis, suddenly experienced extreme difficulty in breathing and swallowing, owing to the swelling of the left side of the tongue, which filled the entire mouth and measured nearly three inches in thickness. When the swelling decreased after opening of the sublingual veins, the left cheek and side of the neck, and soon also the right side of the tongue, face, and neck rapidly began to increase. On account of the rolling of the tongue to the right side, longitudinal cuts had to be made. Recovery took place without formation of pus. M. TOEPLITZ.

382. The instrument consists of two ice bags connected with each other and fastened around the head by two bands, so that the nostrils are left open for plugging. It is used with ice in epistaxis and nasal operations, and with hot water in cases of acute coryza. A small receptacle is attached to the bag for drugs to be inhaled. M. TOEPLITZ.

383. The handle is made of two parallel brass bars, 11 *cm* long, mounted in rubber blocks at both ends. A third rubber block slides along the bars when guided by the fingers inserted through the rings on the block, while the thumb rests in the ring at the rear end of the handle. The sliding block holds two insulated steel stylets, which when pushed forward protrude through the two canulæ in front of the handle just far enough to allow a wire to be slipped through the eye in each stylet. The current enters the instrument through the cords permanently attached beside the rear ring. The key establishing the circuit is placed in the length of the cords, twelve inches from the handle.

M. TOEPLITZ.

384. The patient, aged sixty-one, had been shot forty years ago, with a bullet, which entered the right side about two inches below the ear lobe and passed out of the left side directly opposite the point of entrance. RANKIN describes as the result of the injury, two outer cicatrices, situated two inches below each ear lobe, and two inner ones, a little below and behind the tonsils, with a superficial cicatricial line connecting them and running directly across the posterior wall of the pharynx.

M. TOEPLITZ.

385. The new snare is a modification of Jno. Wright's écraseur. The ratchet is made stronger, the wires run through grooves and are fastened by a screw cap. The instrument is armed with a steel lance for transfixing and a windlass to help out the ratchet. The second instrument is a Jarvis snare with a double canula and transfixion darts in either chamber ; the wire is also fastened by a screw-cap. M. TOEPLITZ.

386. The instrument consists of three fenestrated or solid blades on a straight square bar, the central being stationary, the other movable. The central and one outer blade hold the septum like a clamp, while the third blade is firmly brought against the ala nasi and locks itself. M. TOEPLITZ.

387. The most common cause of acute naso-pharyngeal inflammation is influenza, which by the smallness of its microbe easily enters the accessory recesses, sinuses, and deflections in that locality. This is illustrated by the report of two cases of disease of the frontal sinus and Highmor's antrum respectively. Other causes are measles, pertussis, scarlet fever, diphtheria, pseudo-diphtheria, erysipelas, gonorrhœa, and syphilis. There is usually an inflammation of the lymph nodes present in the adjacent regions. The constitutional symptoms are mild or severe according to the gravity of the inflammation and the nature of the primary disease. SMITH urgently advises early treatment with antiseptic inhalations.

BOOK REVIEWS.

I. DR. J. HEGETSCHWEILER : **Die phthisische Erkrankung des Ohres, auf Grund von Thirty-nine Sections berichten Bezold's.** (Tuberculous affections of the ear, based upon Bezold's report of thirty-nine autopsies.) Wiesbaden, J. F. Bergman, 1895.

Reviewed by Dr. E. Bloch of Freiburg i. Br.

(Translated by Dr. A. O. Pfingst.)

The author has, in this creditable work, considered the macroscopic changes which take place in the ears of phthisical patients in whom connection could be traced between the systemic infection and the ear complication. He reviews thirty-seven cases of purulent otorrhœa in tuberculous patients taken from Bezold's clinic and makes reference to two cases previously published by Bezold. He then takes up the affections of special parts of the ear characteristic of tuberculosis, selecting his material from the cited cases and from previous publications. The affections of the brain and its envelopes, of the internal carotid and the neighboring sinus, are also considered. He gives the clinical history of tubercular affections of the middle and internal ears in typical cases, and emphasizes the fact established by Bezold that the perception for low notes or sounds in these cases is exceptionally acute. The author attributes this to a loss of the intrinsic muscles of the ear in phthisical conditions and the resulting relaxation of the sound-conducting elements. The osseous chain is made more motile by virtue of which the vibratory action is facilitated. He concludes that the prognosis of tuberculous ear troubles depends largely upon the general condition of the patient; where this is good the ear trouble also usually terminates favorably.

The publication will be a valuable addition to the library of every otologist.

II. **Diseases of the Ear** (Second Edition). By THOMAS BARR, M.D. Published by Maclehose & Sons, Glasgow.[1]

The second edition of Dr. Barr's book is in many respects different from the first. The whole has been revised, and a considerable part rewritten. Three new chapters appear, one on symptomatology; and additional ones on vascular and intracranial complications of purulent disease of the ear, and on the nose and throat in relation to disease of the ear. The type is larger and the size of the page increased. Dr. Barr's purpose is not to produce an exhaustive treatise, but to present main facts to meet the wants of medical students and practitioners; in this purpose he is entirely successful; his style is concise, and, when needed, emphatic. The book is the more welcome as being the experience of an otologist who has seen much practice, and not a handbook and guide to the works of others, as so many books of this nature are. In fairness to Professor Gruber it must be noticed that his method of catheterization is not accurately described; for instead of rotating the catheter directly after it is felt to embrace the soft palate, Gruber distinctly teaches that the catheter must then be pushed away from the palate for 5 *mm*, before rotating, and in his book gives a scheme illustrating this.

The new chapter on symptomatology is exceedingly good and useful. In the chapter on causation no mention is made of tabes, and in describing nasal diseases in relation to the ear, suppurative disease of the accessory sinuses is entirely ignored, and one would expect fibroma and sarcoma of the naso-pharynx to receive at least passing notice.

A new method of classifying middle-ear suppuration is adopted; instead of into acute and chronic, both conditions are included in the three following stages:

1. Before perforation.
2. Purulent discharge.
3. After discharge has ceased.

This is a broad way of looking at it, but it is a question whether it is the more practical, or even warranted on pathological and clinical grounds.

Mastoid and intracranial diseases and their treatment are dealt with in a clear and masterly manner; Dr. Barr is an advocate for the use of the globular dental bur, and recommends White's Dental Manufactory in Philadelphia as the most reliable place for obtaining the instrument. In describing the operation for removal of the ossicles, we are surprised that the author has not mentioned the extractor of Delstanche, an instrument which much simplifies the operation; in discussing the pros and cons of the operation, the improvement in hearing which is sometimes effected by the removal of the malleus and incus when their heads are carious, is not taken into consideration; with regard to the operation in non-suppurative cases, we are glad to have the author's opinion that it is still sub judice.

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[1] In the October number, 1896, of the ARCH. OF OTOLOGY we briefly noticed the appearance of Dr. Barr's text-book; the above review from an English pen was received too late to appear in the same issue.—ED.

One of the functions of the mastoid cells (including the antrum it is presumed), stated by the author, is to act as resonance chambers to the tympanic vibrating structures and thus to intensify the sound; but surely the necessity for resonating chambers is over when once sound waves have reached the membrane and chain of ossicles. Every one will not agree with him in describing the antrum as a mastoid cell.

We should have been glad to have had a fuller account of internal-ear diseases; their description is decidedly meagre.

The table of formulæ at the end is very full and embraces every thing of value to the otologist.

The illustrations, which have been doubled in number, are excellent.

We congratulate Dr. Barr on having made a valuable addition to the literature of the subject; his book is not only of value to students and practitioners, but also to those who are practising the specialty. A. H. K.

III. **Handbook of Diseases of the Ear, for the Use of Students and Practitioners.** By URBAN PRITCHARD, M.D., Professor Aural Surgery, King's College, London. Third Edition, illustrated. H. K. Lewis, London, 1896.

The new edition of this deservedly popular compend of 275 small-octavo pages is a neatly gotten up, excellently arranged, and clearly written treatise on the essentials of aural surgery, such as the student and general practitioner want. That it is brought up to date is especially noticeable in that department in which the progress of otology, during the last decade, has been most conspicuous, the diseases of the attic, mastoid, and their intracranial complications. The descriptions of that part, though concise, are very instructive, and the rules of treatment simple and reliable.

A number of instruments and operative methods, which the author prefers, will not be favored by others, as practice and individual aptitude play a great part in our predilections and accomplishments. The short and very broad-brimmed speculum of the author has proved to the reviewer too unsteady and too short for a thorough exploration of the whole depth of the ear canal. The dilating ear speculum (Kramer's) is of little service, as far as we can see, in widening our view into the ear canal, but is, we think, the handiest *nose* speculum.

Exostosis of the ear canal is treated in detail. Among the operative procedures the reviewer misses the removal of the tumor out of the healthy bone tissue with which its base is united. For the solid exostoses which occlude the canal—and these are the ones in which removal is unconditionally indicated—the chiselling out of the healthy bone is the safest, easiest, and most thorough operation and, after detachment of the auricle, is easily executed. The rotating bur, which the author favors, is, in our opinion, an unsatisfactory instrument in the ear canal, as well as in the passages and neighboring cavities of the nose. To attack an ivory exostosis at its periphery, pierce or grind it down from the surface, is a thankless and, frequently, an impracticable task. These tumors should be enucleated out of their healthy surroundings.

In the chapters V. and VI., *Injuries and Diseases of the Middle Ear*, we find little to be specially pointed out. We concur with the author that the accumulation of serous or mucous fluid is no longer considered of frequent occurrence.

The treatment of *adenoid growths* of the naso-pharynx is described with masterly precision and clearness ; the finger-nail (which the author favors more than most aurists do at the present day, if we are well informed), the forceps, and curette operations are so graphically presented in their details, that the practitioner who follows the precautions and rules laid down by the author cannot fail to operate well. In most children the author recommends to begin the operation under short general anæsthesia. He uses the finger-nail of his left hand as a guide during the operation with instruments. After the use of these he re-examines the region with the index-finger of his right hand, and removes with it remnants that may have escaped the instrument.

The *nasal growths* (hypertrophy and atrophy of the mucous membrane and polypi) are appropriately sketched as far as they have a bearing on aural disease.

The remainder (two fifths) of the book treats of the more serious ear troubles and their intracranial complications. It is needless for our purpose to follow the author through this part; suffice it to say that the whole presentation manifests great personal experience and good judgment in the pathology and treatment of this large group of aural ailments, in the management of which the progress of modern ear and brain surgery has celebrated its greatest triumphs. H. K.

IV.—**Deaf-Mutism; A Clinical and Pathological Study.** By JAS. KERR LOVE, M.D., Aural Surgeon, Glasgow, and W. H. ADDISON, Principal of the Glasgow Deaf and Dumb Institute. Jas. Maclehose & Sons, 1896. 9*s*. net. Macmillan & Co., New York.

This book of 369 octavo pages, beautifully printed on good paper, is very interesting, and we regret that we can give only a short notice of it. The medical part is by Dr. Love, and comprises the following chapters: On deaf-mutism in general, the character of deaf-mutes, the ear and hearing (elementary), the hearing power of deaf-mutes, congenital and acquired deafness, very interesting accounts of the heredity of deafness, and a good review of the investigations on the pathological anatomy of the hearing organs of deaf-mutes by Hartmann, Moos, Uchermann, Mygind, Steinbrügge, J. K. Love, Scheibe, Michel, Politzer, and others. The chapter on congenital deafness is of more than medical importance; it is philosophically treated. Among the authors cited and used we find also Graham Bell with his famous paper "On the Formation of a Deaf Variety of the Human Race" (1883); The diagnosis, prognosis, and treatment of deaf-mutism, as well as the census returns, are duly considered.

The remainder of the work is devoted to the education of the deaf-mutes and its results.—We desire to give the excellent book a hearty recommendation. H. K.

V.—**Meningitis Serosa Acuta.** By DR. G. BOENNINGHAUS. J. F. Bergmann, Wiesbaden. 99 pp.

A patient with some cerebral symptoms after an acute otitis media purulenta was operated upon by the author in the hope of finding a cerebral abscess. No abscess was found, but a considerable quantity of cloudy fluid was withdrawn from the ventricles. Headache, fever, apathy, in fact all symptoms disappeared permanently, so that the diagnosis of meningitis serosa acuta seemed probable.

This disease has been but little investigated, and its existence is still doubted by some authorities. The author has succeeded in collecting twenty-eight cases, and has carefully examined their histories. From this material he has endeavored to present a complete medical picture of the disease, with reference to its pathology, genesis, course, prognosis, symptoms, diagnosis, and treatment.

He arrives at the following conclusions: 1. Acute idiopathic hydrocephalus exists and is caused by a meningitis serosa acuta. 2. Meningitis serosa acuta occurs in a malignant form, and is then usually a meningo-encephalitis serosa acuta. This form is of but little clinical importance. 3. Meningitis serosa acuta may be benign, and is then a meningitis serosa interna (ventricularis). The disease begins as a meningitis serosa externa, and is characterized by an active (automatic) closing of the ventricles. This form is of great clinical interest. 4. Meningitis serosa acuta benigna may simulate a purulent or tubercular meningitis, an abscess or tumor of the brain, and may terminate fatally or in recovery. 5. The disease can only be diagnosticated with certainty when the symptoms of a tubercular or purulent meningitis, an abscess or tumor of the brain disappear completely and without recurring after operative withdrawal of cerebro-spinal fluid. If the symptoms disappear without operation, the diagnosis is probable. The quicker the disappearance of the symptoms the more probable is the diagnosis. 6. Meningitis serosa acuta can be surely cured by the evacuating of cerebro-spinal fluid. The operative procedures, *i. e.*, lumbar puncture, punctures of the ventricles and simple opening of the cerebral dura are not equally effective. A. H. K.

MISCELLANEOUS NOTES.

The new UNIVERSITY EAR-CLINIC OF HEIDELBERG was opened October 16, 1896. On the ground-floor of the new building there are the examining, operating, and waiting rooms, the office room of the executive aurist (Prof. PASSOW), the laboratory, and the kitchen. In the first story are the patients' rooms and bath-rooms, in the second floor are the dwelling-rooms for two assistants.—*Wien. med. Wochensch.*

In the Ear Department of the MASSACHUSETTS CHARITABLE EYE AND EAR INFIRMARY the following appointments have been made:

Aural Surgeons: Drs. F. L. JACK and H. L. MORSE.

Assistant Aural Surgeons: Drs. E. L. PLUMMER and E. A. CROCKETT.

Aural House Officers: Senior, Dr. EMIL AMBERG; Junior, Dr. L. E. WHITE.

PEPLER L. HEMINGTON, M.D., M.R.C.S. has been appointed Surgeon to the Metropolitan Throat, Nose, and Ear Hospital, Fitzroy Squ. W., vice C. ORMEROD, M.D., resigned.

YEARSLEY MACLEOD, F.R.C.S., has been appointed House Surgeon to the Royal Ear Hospital.

We are informed that the coëditor of the ARCH. OF OTOLOGY, Dr. O. KÖRNER, has been appointed *Professor ordinarius-honorarius* at the University of Rostock. The honor would have been greater if the word *honorarius* had been omitted, but such a position as professor ordinarius of otology does not yet exist in Germany. The German medical student is not examined in otology! This absence of recognition of otology is a dark spot in the official firmament of the German universities, whereas otology is a star of no mean brilliancy in the firmament of German medical science.

MEYER MEMORIAL.

The committee in Great Britain having received the amount required for the above purpose, have closed the subscription list, and have forwarded the sum collected by them, £231 13*s*. 6*d*, to the treasurer of the Danish committee. The carrying out of the memorial is entrusted to an international committee.

Contents of the latest numbers of the Zeitsch. für Ohrenh.

Vol. XXIX., No. 4. Issued November, 1896.

16. LOMMEL. Anatomo-pathological changes of the middle ear and sphenoid sinuses in genuine diphtheria. Twenty-five autopsies. (To appear in our next issue.)

17. EULENSTEIN. Otitic pyæmia, cured by excision of the thrombosed int. jugular vein. (In our next issue.)

18. COHEN-KYSPER. New method of treating deafness from chronic catarrhal and purulent otit. med. (In our next issue.)

19–20. Translation of BRAISLIN'S and WOODWARD'S articles.

21. Report on the sixty-eighth meeting of the otological section of the Germ. Naturalists and Physicians. Frankfurt a. M., Sept., 1896. (In our next issue.)

Vol. XXX., No. 1. Issued December, 1896.

1. KUHN. I. Ac. pur. ot. med. Amnesic aphasia. Operation. Death. Autopsy. Meningitis. II. Cholesteatoma. During operation death by air entering into the injured sigmoid sinus. (To appear in our next issue.)

2. HOFFMANN. Extensive thrombosis from injury of the lat. sinus during operation. Recovery. (In our next issue.)

3. KARUTZ. Folk-medicine in otology, etc.

4. LICHTWITZ. Bezold-mastoiditis. Operation. Recovery. (In our next issue.)

5. HARTMANN. Hyperostosis in external-ear canal. (In our next issue.)

Report on the progress of otology during the third quarter of 1896. (In our present issue.)

VOL. XXVI. No. 2.

ARCHIVES OF OTOLOGY.

REPORT OF THE FIFTH MEETING OF THE GERMAN OTOLOGICAL SOCIETY AT NÜRNBERG ON MAY 22 and 23, 1896.

By Dr. E. BLOCH, Freiburg-im-Br.

Translated by Dr. Arnold H. Knapp, New York.

FIRST SESSION, MAY 22D.

1. Report on the Present Standing of the Tests for Hearing.

(*a.*) Dr. Dennert, Berlin : **General Part.**—The opinions on the function of the semicircular canals still diverge and it is not settled whether musical sounds and noises are perceived by the same organ. D. thinks that there is no essential difference between the two and that one end-organ is sufficient. In tests for hearing, we have to take into account not only the pitch and intensity of sound but also its duration, especially in the upper octaves.

As the results of tests by bone-conduction are rather uncertain, it is better to endeavor to improve our diagnostic methods of tests by air-conduction, which have not yet become sufficiently precise and objective. The utility of the voice as mode of examination is universally accepted ; the examination with the tuning-forks is supplementary.

(*b.*) Prof. Bezold, Munich : **Special Part.**—The tests for hearing should be so simple that every physician could apply them. The tests with the voice and the tuning-forks suffice. In tests with the whispering-voice Bezold principally makes use of numbers. Of the methods with tuning-forks the tests of Rinné, Weber, and Schwabach, appear essential to him. Bone-conduction must therefore be examined, and is normally good in old people. As high sounds are transmitted directly from the air to bone, bone-conduction can best be tested with the A and a′ fork. The former sounds very long, longer than the vibrations can be felt. He likes to use the latter in Weber's test. This test is occasionally of great value in acute affections. An extension of the disease to the labyrinth can be recognized when D. V. is suddenly transmitted to the sound instead of to the affected side. The negative Rinné is so regularly observed in simple diseases of the middle ear beginning with the rupture of the drum, that we may consider a similar result in the so-called scleroses to depend upon similar disturbances of the sound-transmitting apparatus. It is well known that in these cases there is an interference with the mobility of the base of the stapes. In all these diseases there is a limitation of the lower end of the scale, consequently we may assume that the transmission of the lower sounds is normally performed by the chain of ossicles, which is not at all necessary for the highest sounds. This is evident in destruction of the transmission. In middle-ear affections, air-conduction for deep sounds is reduced compared to bone-conduction ; in scleroses, however, the high sounds suffer also. Defects at the upper end of the scale are not of very great aid in diagnosis ; but when joined to shortening of Schwabach's test, a nervous affection can be supposed. The various methods in general must agree in a given case to be of most value.

In the determination of one-sided deafness we can only test up to c^8 by air-conduction as higher sounds reach the other ear through the air.

Discussed by Drs. PANSE, DENNERT, KESSEL, SCHWABACH, BLOCH, BERTHOLD, SCHEIBE, WEIL, BEZOLD.

SECOND SESSION, MAY 22D.

2. Dr. BLOCH, Freiburg : **On the Carotid Sinus.**—The carotid sinus is the plexus of veins surrounding the internal carotid in the carotid canal of the temporal bone, which was discovered by Rektoržik in 1858. Rüdinger has found its lumen to be equal to that of the artery which it surrounds. Diastolic and systolic movements are thus allowed and at the same time the artery favors the blood current in the sinus. The topographical relation between the carotid and the sinus permits an equalization of the circulation in the brain and the neighboring organs of sense. Similar conditions are to be seen in the case of the vertebral artery and in general in all the arteries which lie in the bony canals.

(Rektoržik, Langer). The author then related a case of hemorrhage from the carotid sinus which occurred during an operation on the mastoid. The patient died fourteen months later of hemorrhage from the carotid. The specimen was then demonstrated.

3. Prof. BEZOLD demonstrated the **Improved Continuous Scale** which now consists of ten tuning-forks, two organ pipes, and an ingenious new Galton's whistle. Price, one hundred dollars, without case.

4. Dr. DENKER, Hagen: **Communication on the Physiological Upper and Lower Sound Limits.** A statistical examination, extending over one and a half years, of 1250 school children whose age was thirteen years and over; 956 ears heard whispering-voice in more than 15 m. The lower sound limit was, as a rule, at 15 v. d.

Discussed by Drs. KESSEL, BEZOLD.

5. Dr. BÜRKNER, Göttingen, presented **a Specimen of Malformation of the Ear.**

Discussed by Drs. SCHEIBE, BEZOLD, HARTMANN, KESSEL.

6. PROF. SIEBENMANN, Basel: **The Central Acoustic Tract and its Destrucion by Tumors of the Corpora Quadrigemina.**

7. Dr. ANTON, Prag: **Tumors of the Eighth Nerve. Report of Two Cases.**

A fifty-five-year-old man, with headache, transient obscuration of visual field, pupils dilated and immobile, and optic neuritis. Tinnitus, right drumhead retracted, hearing could not be tested because of stuporous condition of patient. Watch: L, o; R, contact. A tumor as large as the fist, a fibro-sarcoma, was found between pons and cerebellum. On the left side the nerve-exits were free, on the right the Vth, VIIth, and VIIIth nerves passed under the tumor, to which the facial and auditory nerves were firmly adherent.

The second case was that of an unexpected condition at autopsy of a laborer, aged sixty-eight. A tumor, the size of a nut, also a fibro-sarcoma was found adherent to the left auditory nerve, possibly originating from the neural sheath, extending to the porus acusticus, and which had caused an atrophy of the auditory and facial nerves.

8. Dr. MANASSE, Strassburg: **Demonstration of Pathological Specimens.**—A solitary tubercle on the VIIIth nerve in the case of a consumptive. The growth was situated to the left of

the pons. The facial and auditory nerves were imbedded in the cheesy mass and could not be isolated.

The author also reported on (1) a tumor of the cochlea which proved to be an endothelioma of cribriform structure arising from the endothelium of the lymphatic vessels, and (2) a carcinoma of the ear.

9. Dr. LEUTERT, Halle: **Bacteriological Examination in Suppurative Middle-Ear Disease.**—The author examined the pus of acute empyemata of the mastoid process after the usual method and with inoculation of animals. In accordance with Bardoni-Uffreduzzi and Gradenigo, he found the pneumococcus (Fränkel-Weichselbaum) to be less virulent than in pneumonia. Of 41 cases Leutert found streptococci alone in 19, staphylocócci alone in 2, tubercle bacilli in 2, pneumococci in 9, uncertain in 3. Of the cases in which streptococci and staphylococci were found, the suppuration in the tympanic cavity continued, but had ceased in most of the cases containing pneumococci. With the latter, epidural abscesses occurred more frequently than with other germs. This difference in the clinical course is not absolute, since an infection by streptococci may be very similar. Leutert, however, thinks that a relatively rapid course of purulent otitis media, a more frequent complication with affections of the mastoid process and cranial cavity, and a temporary latency in the mastoid process occur frequently with pneumococci, rarely with streptococci. This agrees with the observations of Zaufal. If pneumococci are found in the middle ear or in the mastoid process at the operation, complications may be expected, *i.e.*, in the latter an epidural abscess may be looked for by exposing the dura mater at the tegmen tympani, which is a perfectly harmless procedure.

10. Dr. HARTMANN, Berlin: **The Changes in the Bony Auditory Canal in Deformed Skulls.**—The author showed a number of skulls and photographs illustrating his paper. Dr. v. Luschan found in 70 to 80 per cent. of the deformed skulls he had obtained from Peru, defects in the tympanic bone varying in size from a pinhole to the size of a lentil; not unusual was the almost total absence of the tympanic bone, as was demonstrated in these skulls and photographs. Virchow in addition had found a flattening and stenosis of the bony auditory canal in 42.4 per cent. of the skulls.

The author from his examination has arranged the changes in the form of the auditory canal in the following groups:

1. The anterior wall is uniformly depressed, flattened. The lumen has a contracted diameter; the oval shape is replaced by a fissure.

2. The anterior wall is insufficiently developed and the lumen is generally contracted.

3. The anterior wall is sunken in its upper part, in the lower it is bellied out, thus giving the outer margin an S shape.

The occurrence of the defects in the tympanic bone and changes in form of the auditory canal can be explained by pressure on the tympanic bone during the process of deformation, which impedes and disturbs its development.

The changes are often unsymmetrical, which proves that they are not congenital but acquired.

THIRD SESSION, MAY 23D.

11. Dr. SCHUBERT, Nürnberg: **Demonstration of Pathological Specimens.**—Another case of brain abscess in the left temporal lobe was exhibited, in which spasms in the opposite side had been present; also a case of abscess in the occipital lobe, which had caused no symptoms in a patient suffering from bronchiectasis.

12. Dr. KUHN, Strassburg: **Two Cases of Sarcoma of the Ear.**—A medullary and a melanotic sarcoma. The first occurred in a man, thirty-three years old, who exhibited signs of general sarcomatosis. After a fall there was otorrhœa with gradually increasing deafness, loss of teeth, large tumor at mastoid process extending to base of skull and to dura, which, however, was not damaged. Later, he had diabetes insipidus, and, without especial injury, fracture of the right, and later of the left, femur. No autopsy.

The melanotic sarcoma occurred in a woman forty-four years old, who was anæmic but free from ear trouble. Two years previously, there was a small tumor in the auditory canal, purulent discharge, diminution of hearing. The surrounding glands, and especially those in front of the ear were enlarged. The excision of a small part confirmed the diagnosis. The tumor now extends into the tympanum.

Discussed by Drs. JOËL, KÜMMEL, BERTHOLD, SCHUBERT, DENKER.

13. Dr. KÜMMEL, Breslau: **Ear Disease in Pseudoleukemia** (*multiple lymphosarcomatosis*).—Report of the case of a man, forty-

six years old, with a tumor of the left tonsil as large as a hen's egg, which was ulcerated inferiorly though without fetor or dysphagia. The glands of the neck were involved. The tumor disappeared after treatment with arsenic; repeated examination of the blood showed no pathological change. After a certain length of time of good health, both sides of the neck again became swollen, the face was bloated, pale, exophthalmus and hemorrhages under the conjunctiva took place. Dysphagia, marked dyspnœa, and stridor. The left tonsil was enormously enlarged, the nasal mucous membrane was swollen, spleen, liver, and inguinal glands enlarged. There was some deafness and on both sides hæmatotympanum. The blood showed the signs of leukæmia—1 : 20 instead of 1 : 358. At autopsy a hemorrhagic exudate was found in the attic enveloping the malleus and incus. In various parts of the body leukæmic tumors were present.

Discussed by SCHWABACH, NAGER, KÜMMEL.

14. Prof. KÖRNER, Rostock: **Operation for the Acquired Occlusion of Auditory Canal.**—Otorrhœa and cicatricial contraction of the auditory canal down to a narrow fistulous tract resulted from a blow of a horse's hoof. Flaps were taken from the posterior wall of the meatus, after some bone of the mastoid process had been chiselled away; firm dressing and recovery in three weeks.

Discussed by Drs. LEUTERT, WAGENHÄUSER, NOLTENIUS.

15. Dr. SCHEIBE, Munich: **Opening of the Mastoid Cells under Local Anæsthesia.**—The author has operated on a case with degeneration of the heart-muscle and diabetes, using chloride of ethyl as a local anæsthetic; the antrum and an extradural abscess in the posterior cerebral fossa were exposed without causing any pain. In six additional cases, of which five were acute, he was forced to resort to general anæsthesia in only one. The author thinks that local anæsthesia can be employed in cases where no tenderness exists over the mastoid and the posterior wall of the meatus is intact. A hypodermatic injection of morphine can be given before. At the drumhead chloride of ethyl has been of no value.

Discussed by Drs. KÜMMEL, HOFFMANN, BEZOLD, BLOCH, THIES, HARTMANN, PANSE.

16. Dr. HARTMANN, Berlin: **A Case of Dysbasia Hysterica Combined with Otalgia Hysterica.**—The patient, thirteen years old, had suffered with a right acute otitis two years ago.

Mastoidotomy was performed six months later on account of very severe pain; the pain then ceased. Last year patient was again taken ill with pain in the ear and fever; after paracentesis no fluid escaped. In addition, patient was unable to walk, and on attempting to do so, he would stagger and require to be led. The drumhead showed no inflammatory changes, the hearing was normal. Pulse and temperature normal. Great pain during the night. When the patient was asked to sit up in bed, he did it quickly and without vertigo. In standing up patient staggered in all directions. No other disturbances of innervation or sensibility were present. After four applications of electricity the pain and disturbance of gait disappeared. This agrees with a group of symptoms which Blocq calls astasia and abasia. When the disturbances are of minor degree, Oppenheim has named the affection dysbasia.

The hysterical character was assured by the rapid recovery. It is probable that the otalgia of the previous year, which necessitated a mastoid operation, was also hysterical.

17. DR. SCHMIDT, Leipzig: **Nasal Obstruction due to Chronic Hypertrophy of the Mucous Membrane.**—Author is opposed to galvano-cauterization and has abandoned it as wearisome or the effect is accompanied by too great a reaction. He prefers glacial acetic acid or chromic acid. On the septum he chooses the bloody operation and in marked swelling of the lower turbinate removes the bone with a saw. The after treatment consists of irrigation with salt water.

Discussed by Drs. HOFFMANN, HARTMANN, BLOCH, KUHN, NOLTENIUS.

18. Prof. WALB, Bonn: **Demonstration of a Self-Acting Pressure Probe.**—This instrument is set in motion by a storage battery. The switch must not be attached directly to the instrument as it would annoy the patient.

It is best to commence the treatment with the hand probe before going over to the more powerful instrument. Author could let it act no longer than two minutes.

Discussed by Drs. BERTHOLD, WALL, STIMMEL.

19. Dr. KÜMMEL showed a **Rubber Stamp** for diagrams of the ear and nose.

20. Prof. SIEBENMANN presented a set of **Tympanic Canulæ.**

Discussed by Prof. BEZOLD.

21. Dr. HARTMANN demonstrated **Gutzmann's Stroboscope** to facilitate lip reading by deaf people; a small **Hearing Appa-**

ratus made of celluloid to enlarge the surface of the auricle, analogous to the hand placed behind the ear; and a modified glass dish to catch the fluid during the syringing of the ear.

22. Dr. EULENSTEIN, Frankfort, exhibited a **Portion of the Left Internal Jugular** which he had **Resected** on April 18th of this year in a twenty-five year-old patient. The vein contained a purulent softened thrombus. It was a case of cholesteatoma of the left temporal bone in which severe pyæmic symptoms developed. The middle-ear region was exposed according to Zaufal's method, and a large extradural abscess in the left posterior cerebral fossa evacuated. Owing to the extensive pachymeningitis externa it was very difficult to distinguish the wall of the sinus from the remaining dura. The sinus was accidentally opened and pus escaped. With a sharp spoon the channel was then cleansed. The chills continued, and on the third day after the operation the jugular vein was ligated. The jugular felt soft, and on section a soft puriform thrombus appeared. The incision was then enlarged to within 3 *cm* of the clavicle, and another ligature applied, but it was impossible to get beyond the thrombosis. It is remarkable that beyond some tenderness on pressure no other sign of thrombophlebitis existed. Jaundice, infarction of middle lobe of lung, swelling of spleen, and albuminuria were present but later disappeared. At present, five weeks after the operation, there is dulness over the lower part of the left lung and purulent expectoration. The temperature varies between 36°.8 and 38°.2; the general condition is satisfactory.

Next year the meeting will again be held on Easter in Dresden.

REPORT ON THE PROCEEDINGS OF THE SECTION ON OTOLOGY AT THE SIXTY-EIGHTH MEETING OF THE GERMAN NATURALISTS AND PHYSICIANS IN FRANKFURT ON THE MAIN, SEPTEMBER, 1896.

By Dr. E. BLOCH, Freiburg-im-Br.

Translated by Dr. Arnold H. Knapp, New York.

FIRST SESSION, SEPTEMBER 21st.

The chairman, Dr. O. Wolf, opened the proceedings with a few introductory remarks.

1. Professor Körner, Rostock : **Demonstration of Specimens.**—(1) A temporal bone designated for teaching purposes, with a section through the tympanum and the antrum ; the part which is usually removed in operation was sawn out of the anterior half of the temporal bone in the form of a wedge. (2) A specimen showing spontaneous recovery, as after Zaufal's operation. (3) Examples of tuberculous disease. The author emphasized the fact that the infection can not only be transmitted through the tube, as by coughing, but also by way of the blood circulation. The latter method explains the frequent extensive destruction of bone. A specimen showed an acquired fissure in the tympanic wall of the carotid canal, another had a fistula in the posterior wall of the auditory canal. In one case the tuberculous affection of the tympanum and mastoid process was older than the disease of the lungs. In another case there was an acute otitis media with mastoid complication, fever, and pain. An operation was performed, but the subsequent course showed progressive involvement of the bone so that two further operations were required. The lungs became affected, and a general miliary tuberculosis set in ; tubercles extended directly from the dura into the brain substance. The temporal bone showed large losses of substances.

In the case of a two-year-old child, there was an extradural abscess found under the squama and destruction of bone in the direction of the posterior fossa, probably the result of a primary tubercular osteo-myelitis.

Tubercular disease of the mastoid and of the tympanum differ both clinically and anatomically in various cases; several characteristic groups of symptoms could be devised.

Discussion.—Dr. v. WILD cited the case of a patient with lupus who was taken ill with a tubercular otitis media, with pain and continuous fever. The symptoms persisted, notwithstanding two operations on the mastoid, until a radical operation was performed.

Dr. JANSEN: In children caries is not so frequent as in adults. In the latter the process continues more rapidly after operation, and in the presence of cholesteatoma tubercular granulations appear.

Dr. BLOCH reported a case of a phthisical patient with advanced destruction of the petrous portion of the temporal bone. At autopsy only the upper wall remained. An operation had been performed and the patient's general condition for a time improved.

Dr. KÜMMEL: Tubercular disease of the ears in children is often not recognized, as they do not complain of the ears and the general symptoms are more prominent; nevertheless enormous destruction of bone can take place. He does not like to operate in tuberculous cases.

Professor PASSOW was forced to operate on three tuberculous patients on account of a periosteal abscess. Improvement and rapid cure followed. In the case of a child with fever and pain over the right mastoid, a large cavity was found directly under the skin. The bone was wanting, normal dura was exposed to a large extent, and the sinus seemed healthy. Meningeal symptoms appeared in a few days. Optic atrophy, a large solitary tubercle in the cerebellum, and miliary tubercles were found on the base of the brain.

Dr. KUHN also thinks that an operation must often be done in tuberculous patients. It depends chiefly upon the form of the disease. In adults the ear is usually secondarily invaded. In the presence of certain indications the operation can be attempted. In children where the process is often localized to the temporal bone, a cure can be effected by the radical operation.

Dr. KÜMMEL would also operate if the indications are urgent.

To simply cure an otorrhœa is not a sufficient reason for the radical operation.

Dr. HARTMANN: At the autopsies of phthisical patients extensive destruction in the temporal bone is found, without having given any signs during life. We should only operate when signs of inflammation are present. In the institute for infectious diseases in Berlin, an acute miliary tuberculosis was observed in a case after the perforation of a cholesteatoma, containing tubercle bacilli, into the sinus.

Dr. JANSEN thinks that the bony wall of the labyrinth is sometimes rapidly destroyed in adults, but not in children. He operates under certain conditions, but not on account of a tuberculous otorrhœa alone.

Dr. v. WILD operated on a child several years ago, the tubercular ear-disease was cured, but now there are tubercular ulcers in the larynx. In another child, eight months old, with double subperiosteal abscesses and fetid otorrhœa, a radical operation was performed. The one side healed; on the other a fistula remained, and tubercular adenitis now exists.

SECOND SESSION, SEPTEMBER 22D.

Together with the Section on Neurology and Psychiatrics.

Prof. OPPENHEIM, Berlin: **The Differential Diagnosis of Abscess of the Brain.**—The speaker will limit his remarks to the traumatic and otitic abscesses. In the diagnosis of **Traumatic Abscess,** traumatic meningitis, traumatic neurosis as well as encephalitis must be considered. Traumatic apoplexy can be taken for brain abscess. The hemorrhage after a contusion of the skull may not show any symptoms for weeks or for years until the bloody extravasate has been changed to a cyst. In the latter case the presence of suppuration especially of increasing intracranial pressure must be kept in mind. Functional neurosis like traumatic hysteria and hystero-neurasthenia are also to be mentioned; the cause for the abscess is however absent. According to Friedmann the cause is to be found in a disease of the smaller cerebral vessels.

Otitic Abscesses, even if very large, may remain occult and their diagnosis is difficult as against meningitis, sinus-thrombosis, and extradural abscess. Other cerebral affections with or without ear-trouble may complicate the symptoms, as uncomplicated otitis media, serous meningitis, brain tumor, arterio-sclerosis, hysteria, and others. Even the usual purulent meningitis may do this; a circumscribed meningitis may simulate an abscess; on the other hand a diffuse may have none or only a few symptoms, as Jansen and others have shown. When a diffuse purulent cerebrospinal meningitis is associated with a brain tumor the diagnosis is at best difficult to make. In an otitic meningitis it is well to be on the watch for spinal symptoms like stiffness of back, rigid extremities, radiating pain, disturbance in tendon-reflexes, the bladder and rectum. Loss of patellar reflex has been observed in brain abscess. The meningitis which accompanies the otitis may remain localized to certain regions of the spinal meninges, as the lumbar part. According to MacEwen the temperature is normal or subnormal, at least fever cannot be regarded as a diagnostic aid. Continued high temperature is suspicious of some complication to the brain-abscess, transient elevations however are common. The most important sign of a brain-abscess is probably a slowing of the pulse. In the diagnosis, a serous meningitis must also be thought of; it may precede a more severe disease. Lumbar puncture may be of diagnostic value in this case, though this test may fail. Symptoms similar to those of brain abscess may be caused by uncomplicated otitis media, *e.g.*, disturbance of equilibrium, headache, etc. Non-suppurative encephalitis, especially the encephalitis hemorrhagica, may simulate an abscess suspected. Under the cloak of an hysteria a severe brain affection can be concealed.

Discussion: Dr. LEUTERT is in favor of lumbar puncture in the differential diagnosis of meningitis and sinus thrombosis. A few cubic centimetres of the fluid are sufficient.

Dr. FREUND draws attention to the fact that a displacement of the vessels at the base of the brain may produce similar symptoms (hemianopsia). Anæsthesia dolorosa in the face starting from the Gasserian ganglion or branches of the fifth nerve may be focal symptoms or due to pressure.

Dr. EULENSTEIN emphasizes the difficulty of diagnosis between tumor and abscess, and cites a case of fetid otorrhœa with tubercles of the brain and areas of softening.

Prof. KÖRNER: It must never be forgotten that the symptoms in children differ from those in adults. Up to the twentieth year, a simple otitis media may show severe cerebral symptoms, or a sinus thrombosis or extradural abscess in the middle cerebral fossa may simulate meningitis. Extradural abscesses produce aphasic symptoms only in children.

Prof. OPPENHEIM thinks that we are not sufficiently experienced in lumbar puncture, to decide on the method. In adults a simple otitis media may cause very severe symptoms.

THIRD SESSION, SEPTEMBER 22D.

1. Dr. OSTMANN, Marburg: The relation between **the eye and the ear.** This usually depends on changes in the eyes consecutive to ear disease.

The influence which the ear exerts through the vestibular branch of the eighth nerve on the muscles of the eye is well known. It has frequently been shown by experiment and confirmed by clinical observation that excitation of the membranous labyrinth produces nystagmus. Excitation of one side causes bilateral movements of the eyes.

Double and secondary sensations, have often been observed. The light and color sensations caused by perception of sound are referred to the ear, and the function of the eye is undisturbed.

The conjoined excitation-of one sense on the stimulation of another must also be mentioned.

In severe otitic suppuration, changes at the optic papillæ are noticed, and the importance of an ophthalmoscopic examination is acknowledged. In thrombosis of the cavernous sinus the swelling of the eyelids is the most characteristic of the ocular symptoms.

Discussion: Dr. KÜMMEL has observed a purulent infiltration of the Gasserian ganglion without presence of trigeminal neuralgia.

Dr. STEIN has often found nystagmus in certain directions and changes in the pupil in his experiments.

Prof. SCHWARTZE. It is well known that touching a semicircular canal with a probe causes lateral, and never rotatory, nystagmus. He asks whether the presence of a neuritis optica can be explained by a tympanic affection alone.

Dr. OSTMANN does not think so and therefore considers optic neuritis an indication for operation.

Dr. JANSEN has not always observed nystagmus on probing an exposed semicircular canal even when this could be taken for healthy.

Prof. SCHWARTZE : That nystagmus is wanting in destruction of the ampulla is conceivable.

Dr. O. WOLF asks if vertigo was also noticed on probing.

Prof. SCHWARTZE : Vertigo is always present in such cases.

Dr. JANSEN : Vertigo can also be wanting in defects of the semicircular canals.

2. Prof. SCHWARTZE : **Cholesteatoma Verum Squamæ Oss. Temp.**—The speaker exhibited the temporal bone of a man, forty-one years old, who died of phthisis. A large cholesteatoma was found in the squamæ. The middle ear was free, a scar in drumhead, no history and no traumatism. The specimen speaks against the immigration theory.

3. Prof. SCHWARTZE : **The Excision of Carious Ossicles.**—The speaker presented a collection of about 2000 carious mallei and incudes which had been extracted from the auditory canal or during mastoid operations. The head of the malleus alone is frequently carious, still more frequently the incus, especially its long process ; the articular surfaces of the two bones are usually intact, and are very seldom the starting-point of the disease. In some cases ankylosis has been found, more rarely exostoses or osteophytes. Perforation in Shrapnell's membrane just over the short process is characteristic for caries of the hammer. The speaker still maintains his attitude against the operation from the auditory canal (Stacke), and advises a radical operation when the process had extended or in the presence of cholesteatoma.

Discussion : Dr. JANSEN has seen carious ossicles extracted in completely healed cases, and healthy ossicles removed in cases of perforations in the upper part. Such perforations can be caused by a mastoid suppuration where the bone is sclerosed and adhesions to the labyrinthine wall exist ; thus the membrana flaccida is the only outlet.

Prof. SCHWARTZE : Only perforations vertically above the short process, and not others in Shrapnell's membrane prove caries of the hammer.

4. Dr. LEUTERT, Halle : **Pyæmia and Sinus Thrombosis.**—The difficulty in the diagnosis of a sinus thrombosis would be removed if we could assume that pyæmia in cases of suppurative ear-disease and acute empyema of the mastoid was always caused by sinus thrombosis. It has not been proven that a thrombosis of the diploic veins can produce pyemia. The condi-

tions about the jugular bulb are favorable for the formation of a thrombus; the dilatation of the venous channel and the accompanying vortical movement. The speaker tries to explain the failure to find a thrombus as due to an inaccurate search, especially in the bulb. The small diploic veins need not be considered, because they become so rapidly occluded as to prevent the accession of larger quantities of toxines into the circulation. The process in the mastoid cannot be compared to an acute osteomyelitis where the medulla with its broad, thin-walled vessels are affected. Leutert thinks that the lymphatic circulation can also be excluded. He therefore comes to this conclusion: continuous fever in acute or chronic middle-ear disease without retention of pus, and when meningitis can be excluded, is due to an affection of the sinus. Chills during the acute stage, with no other sufficient cause, confirm the diagnosis. It is important to distinguish between parietal thrombi and occluding thrombi. The former when smooth do not furnish bacteria to the blood, and are also less dangerous to the brain. Puncture of a sinus is of doubtful value, as in case of a wall thrombus there may be fluid blood or the thrombus may be situated at the bulb.

Dr. Leutert sums up his views as follows: 1. Pyæmia without sinus thrombosis has not yet been shown to exist and can be excluded in making the diagnosis. 2. The diversity of metastases following sinus thrombosis in acute and chronic otitic suppurations is explained by the various kinds of thrombi. 3. In every case of empyema of the mastoid following an acute otorrhœa and where the temperature is 39° or over, notwithstanding free drainage from the tympanum, we should operate and expose the sinus. 4. In acute cases, if the fever has not fallen on the third day or after a fall of temperature high fever again sets in with or without chills, the sinus should be freely opened. 5. If the case is acute and high fever has existed for several days, or, in a chronic case, if high fever appears for a number of days, even if the mastoid involvement is not marked, the sinus should be opened at the first operation. Meningitis, of course, should first be excluded by lumbar puncture. 6. High temperatures in small children have not the same diagnostic significance, but the possibility of a sinus thrombosis must be kept in mind. 7. Isolated thrombi at the jugular are usually caused indirectly by bacteria which have passed through the diseased sinus wall. 8. Conclusions may only be drawn from the puncture when the latter is positive.

5. Dr. Eulenstein, Frankfort, presented a case of **Otitic Pyæmia Cured by Resection of the Thrombosed Int. Jugular Vein.** This case was reported at the Nürnberg Meeting, see p. 118, and is published full in this number, p. 147.

6. Dr. Hartmann, Berlin : **Ligature of the Jugular Vein in a Case of Brain Abscess and Sinus Thrombosis Terminating Fatally.**—The patient had suffered with a long-standing otorrhœa on one side. From time to time there would be an exacerbation of the symptoms with cerebral signs, which would disappear on restoring the drainage from the middle ear. Fever, headache, and vertigo persisted, and the radical operation was resorted to with exposure of the sinus, which seemed healthy. The symptoms persevered with chills and protrusio bulbi. The sinus was opened, and contained pus and blood. The middle cerebral fossa was also opened above the auditory canal, and a quantity of very offensive pus was evacuated. Recurrence of chills and increasing stupor led to ligature of the int. jugular vein, which was not thrombosed. Sudden death four days later.

At the autopsy the abscess cavity in the temporo-sphenoidal lobe was contracted. The tegmen tympani was carious, and the adjacent dura contained a circular defect three-quarter inch in diameter. The upper part of the sinus contained a firm thrombus, in the lower part the sinus was surrounded by pus, and contained a slight amount. No meningitis.

To the symptoms of brain abscess were added those of a pyæmic process. Neither the opening of the sinus nor the ligature of the jugular vein was of any avail.

7. Dr. Ludwig, Frankfurt : **Report of a Case of Purulent Sinus Thrombosis and Pyæmia.**—The patient had otorrhœa for three weeks, high fever, vertigo, tenderness along the right sterno-mastoid, and chill every other day. The mastoid region was painful on pressure. At the operation, a cavity was found filled with granulations ; the exposed sinus was dark red, covered with granulations. On aspiration the sinus was found to contain bloody pus ; it was freely laid open, cleansed, and packed. The symptoms gradually subsided, though an abscess formed in the arm and below the chin. The patient has now been free from fever for two weeks, and is almost cured.

Discussion to 4, 5, 6 and 7.—Dr. Kümmel thinks that a thrombosis may exist in any part of the petrous bone, as well as in the jugular bulb.

Dr. Jansen agrees perfectly with Dr. Leutert, both in the question of diagnosis and etiology. He does not, however, consider it necessary to incise instead of puncturing the sinus. In cases of circumscribed meningitis lumbar puncture is of no value.

Dr. Leutert replied that he did not deny the possibility that thrombi could exist in the petrous bone, but did not think that they could produce pyæmia. Simple puncture of the sinus may be fallacious. Lumbar puncture in diffuse meningitis gives positive results; in circumscribed meningitis we can safely operate on the sinus.

Dr. Jansen: Circumscribed meningitis may also be a contra-indication.

Prof. Körner: It has not yet been shown that an osteophlebitis cannot exist in the mastoid process, or that pyæmia cannot originate from this cause.

FIFTH SESSION, SEPTEMBER 24TH.

1. Dr. Jansen, Berlin: **On a Frequent Form of Labyrinth Affection in Chronic Middle-Ear Suppuration.**—The speaker has observed 170 cases of purulent inflammation of the labyrinth. Defects existed usually in the horizontal semicircular canal and were caused almost always by cholesteatoma, rarely by tuberculosis or scarlet fever. In the latter forms the disease started from the tympanum, while in cholesteatoma it originates in the antrum. He has frequently observed traumatic opening of the circular canals, usually the horizontal one. The symptoms are uniform and characteristic: vertigo, nausea, vomiting, unstable gait, horizontal or rotatory nystagmus. The examination of hearing usually showed no change. When the bony canal alone was opened, all symptoms were wanting.

In the purulent labyrinth-inflammations the circular canals and vestibule are more frequently affected than the cochlea. They occasionally show no symptoms, especially in small children. Disturbances of equilibrium are less in cases of central origin than in labyrinth-affections and occur more frequently than nystagmus. The defects in the upper canal give the same symptoms as the latter.

Eighty-three per cent. were cured. In 8–10 per cent. meningitis followed.

The diseased parts of the labyrinth were treated surgically in a few cases; the vestibule or the horizontal canal was scraped, a part of the labyrinth capsule and granulations were removed. Diseases of the labyrinth, however, may be recovered from spontaneously.

Discussion.—Dr. ADLER: In operative cases, in fractures of the base of the skull or meningitis when the violent symptoms have disappeared, deafness on one side remains. The disturbances of equilibrium appear when eyes are closed toward the affected side and the vertigo is increased when the head is turned to the affected side.

Dr. RUDLOFF cited a case where the horizontal canal was opened in an operation for carcinoma; followed by disturbances of equilibrium but no nystagmus.

Dr. SZENES observed disturbed equilibrium, vomiting, intermittent pulse, and feeble respiration during syringing with a tympanic catheter.

Prof. GUYE has observed disturbance of equilibrium on turning to the diseased side, most rarely to the other.

2. Dr. GURANOWSKI, Warsaw: **Report of Cases of Labyrinth Necrosis.**—In a case of long standing middle-ear disease with mastoid involvement, the radical operation was performed. Three months later a sequestrum was discharged which consisted of the three canals and a part of the vestibule. (Specimen was demonstrated.) Cured.

3. Dr. VOHSEN, Frankfurt: **The Operative Exposure of the Attic and a Plastic Operation on the Auditory Canal.**—The speaker demonstrated a trephine-like instrument with guard which prevents injuries in the depth. For the plastic operation a method of suture was shown which fastens the flap to the bone and prevents the sloughing.

4. Dr. SELIGMANN, Frankfurt: **On the Treatment of Subjective Noises in Sclerosis of the Middle Ear.**—The speaker exhibited an electrical apparatus combined with a Siegle's speculum. Like Delstanche's apparatus the purpose is to move the chain of ossicles but more rapidly. Seligmann has been able to stop the tinnitus for hours after application of his instrument for one or two minutes, when the case was not one of nerve-deafness. The hearing is unaffected. Cases where the drumhead is movable are of course most applicable. The difference in the effect on the tinnitus and the hearing power suggests the question whether the

noises are not originated elsewhere than the disturbance of hearing.

Discussion.—Dr. V. STEIN: On account of the pain which the application of the Lucæ pressure-probe occasionally produced, the speaker has had another instrument made, which he then described.

A CASE OF TUBERCULAR CARIES OF THE MIDDLE EAR PERFORATING THE FENESTRÆ ROTUNDA AND OVALIS—WITH REPORT OF MICROSCOPIC EXAMINATION.*

By Dr. WALTER HAENEL, Dresden, Gy.

Translated by Adolph O. Pfingst, M.D., Louisville, Ky.

(With Plates VI. and VII. of Vol. XXVIII., German Edition.)

THE microscopic changes brought about in the ear by tuberculosis have been the subject of repeated investigation. No one has done as much in this field of research as Habermann [1] who contributed eight cases to the literature on the subject, which he had subjected to a very careful and thorough microscopical examination. I will consider only those cases in which, beside the middle ear, the tuberculous affection had invaded the internal ear. Of this kind I was able to find, beside three of Habermann's cases, one each by Steinbrügge, Gomperz, and Gradenigo.

In Steinbrügge's [2] case a perforation at the upper border of the carious base of the stapes was the cause of the invasion of the labyrinth by the disease. Marked pathological changes had taken place, reaching into the nerve channels.

Gomperz [3] was able, in his case, to trace the point of invasion of the labyrinth by the purulent inflammation to the bony wall separating it from the tympanum which was in a state of dissolution. Gradenigo [4] described, in his publication, a lupous condition of the middle ear which had perforated the fenestra rotunda and caused destruction of the annular ligament of the fenestra ovalis. It had reached the outer semicircular canal through the facial canal and caries of the bony wall between the facial and the semicircular canals.

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* From the Ear Dispensary of the Medico-Clinical Institute of Munich.

Of the three cases of the kind published by Habermann, only one showed evidence of early invasion of the internal ear. In this case the disease was propagated to the inner ear through caries of the promontory, just below the fenestra ovalis. In his other two cases the caries had been so extensive that Habermann was not able to determine positively the location of the perforation into the labyrinth. He believed, however, that the infection had occurred through caries of the labyrinth capsule.

The case which I report was seen by me during life and the parts studied microscopically after death of the patient. The point of perforation into the internal ear could readily be made out owing to the localization of the necrosis and is consequently especially interesting.

The child, who had always been feeble, was admitted to the children's clinic in Munich, May 14, 1895, when three months old, suffering with general furunculosis. Paternal history good. Mother died shortly after the birth of this, her only child, of galloping consumption.

A month ago pus began to come from the right ear of the child. Facial contraction on the left side dates from about the same time.

On May 21st, when I was called in to see the anæmic, and badly nourished, child there was still a general furunculosis and the cervical glands on both sides were enlarged. There was total paralysis of the right side of the face; the palate and uvula were in their normal position. The auditory canal of the right side was filled with foul pus of rather thin character. In the depth of the ear canal, at its posterior superior aspect, some pale granulations could be seen surrounding the small bones and remnants of the drum-membrane. Upon passing a probe beyond the under side of the mass I came upon naked bone which was roughened below and anteriorly but felt smooth at the promontory.

During cleansing of the ear on May 23d the malleus, free of mucous membrane, was discharged. The manubrium, up to within a short distance of the short process, was missing. The rest of the bone showed superficial necrosis. On the next day the incus also came away. It was free of mucous membrane but microscopically showed no necrosis.

On May 27th the granulation tissue spoken of had disappeared, displaying the inner wall of the middle ear. There was a rapid diminution of the vitality, and, upon the following day the child died.

The post-mortem examination revealed acute miliary tuberculosis of the lungs, liver, and spleen, starting from old cheesy tubercular cervical, thoracic, and mesenteric glands. The right petrous bone was carious. There was general furunculosis and muscular atrophy; also catarrhal enteritis.

I examined the temporal bone more accurately and found the dural covering smooth and of normal appearance corresponding to the position of the petro-squamous suture; a number of grayish yellow miliary tubercles were to be seen on the under surface of the dura. They were arranged in a row. The bone near the petro-squamous sutere—the tegmen tympani and the horizontal portion of the squamous bone—was discolored (green) and dark. The ear canal and tympanic cavity were filled with foul discolored pus, of creamy consistence with numerous flocculi. It was very difficult to cleanse the recesses of the middle ear. Examined microscopically, isolated tubercle bacilli were demonstrable in the pus. The drum membrane, malleus, and incus were absent. The sulcus tympanicus had been totally destroyed. Not a remnant of normal mucous membrane could be found in the tympanic cavity. On the apex of the promontorium it was entirely absent, displaying the white bony wall. In the anterior part of the tympanic cavity small shreds of yellowish-gray mucous membrane could be seen between islands of roughened, exposed bone. The fenestra ovalis was also covered by discolored mucous membrane. The stapes in its normal position was freely movable and almost free of mucous covering. A small bead of granulation tissue projected from the fenestra rotunda. The stapedius and tensor tympani muscles had lost their tendons. A small cheesy lymphatic gland was present on the under side of the petrous bone, internally to the annulus tympanicus. The antrum and osseous portion of the Eustachian tube were not opened, in order to preserve the specimen for sections.

The specimen was kept in Müller's fluid for some time (semicircular canals having been opened), then put in alcohol, decalcified in 5 per cent. nitric acid, dehydrated, and imbedded in celloidine.

A series of sections were made perpendicular to the upper border of the petrous-bone, eighty of which were examined and following conditions noted: The osseous portion of the tube near isthmus showed no change. The pathological process had begun near the ostium tympanicum tubæ and extended over the entire tympanic cavity and the antrum. The epithelium of the mucous membrane was exfoliated and in places wanting with exposure of bone. The periosteum showed evidence of inflammation; the blood-vessels were dilated and there was an infiltration of leucocytes. In portions necrosis was in progress recognizable by the lessened affinity of the nuclei for stain. In other places the tissue was entirely broken down and had undergone caseation. These caseous patches were of different sizes, superficial or deep. The superficial ones had been cast off in several instances which gave the mucous membrane a lacerated appearance. Numerous small hemorrhages had taken place in the infiltrated areas.

A hypertrophic condition of the mucous membrane was present but in a few places. In the fenestræ this condition was most marked, with a considerable increase of connective tissue and blood-vessels. The granulation tissue never attained any great size for it soon became necrotic.

The involvement of the bone was marked. A number of Howship's lacunæ of various depths extended into the bone from the periosteal surface. Some were so deep that they opened into the enlarged medullary spaces and Haversian canals. The same pathological process characterized by cell infiltration, caseation, and occasional tissue hypertrophy had taken place in the lacunæ, medullary spaces and Haversian canals. The bony canals had become larger and coalesced through absorption of necrotic bony tissue. This gave the bone a corroded appearance. These changes were most marked in the superficial layers of the bone though in places the process has extended to the medulla and the superficial bone remained smooth. This accounts for the brittle condition we often meet with in chiselling the apparently healthy bone during the mastoid operation. Bezold[1] looks upon this condition as characteristic for tuberculous necrosis. Most of the lacunæ, when the mucous membrane and periosteum have disappeared, were empty. In some large multinuclear cells or osteoblasts were present, but they also seemed to be beginning to undergo necrosis as the nuclei took the stain poorly and the cell outline was not clearly defined.

The advanced stage of necrosis accounts for the absence of the characteristic giant cells. There were some isolated large cells containing several nuclei at the junction of the infiltrated and necrotic tissue which were possibly giant cells.

As with the mucous surface it was the exception for new granulation tissue to be found in the lacunæ of the medullary spaces and Haversian canals.

We find the necrosis of the mucous membrane most marked over the prominences and least in the recesses of the walls of the middle ear.

Thus the annulus tympanicus is bare and its surface is irregular and rough owing to the lacunar absorption in the bone. The sulcus tympanicus has been entirely destroyed and the entire drum membrane is absent. The necrosis has invaded the innermost portion of the ear canal exposing the corroded bony wall. The bone at the floor of the middle ear had also been involved in the carious destruction. The most marked changes, however, have taken place on the inner wall of the tympanic cavity, in the upper and anterior angle of which (the part covering the cochlea) the necrosis has reached a considerable depth. A thin lamella of bone separates the enlarged necrotic medullary spaces from the second and third turns of the cochlea (c. Fig. 1).

The spaces communicated with the surface by large defects. These defects in the bone have reduced the wall of the cochlea to about one sixth of its normal thickness. The medial wall of the tympanic cavity in front of the promontorium was similarly affected. The enlarged medullary spaces, which opened on the surface, extended downwards and inwards leaving but a thin sheet of bone between them and the cochlea (c. Fig. 1).

From the wall of the cochlea the necrosis had extended into the cochleariform process and the roof of the tympanic cavity, giving to these parts a worm-eaten appearance. The necrotic area included the canal for the tensor tympani. The muscle had been entirely destroyed.

The promontorium, which was devoid of mucous membrane though smooth on the surface, contained enlarged and infiltrated medullary spaces on the interior (c. Fig. 2).

The fenestra rotunda, as the avenue by which the infection reached the labyrinth, is worthy of our special consideration. In a section through the fenestra rotunda it was seen that its anterior external wall had become corroded up to the attachment of the spinal ligament (c. Fig. 2). A mass of highly vascular granulation tissue of considerable size projected from the lacunæ (Fig. 2, Wuch. 2), filling up about half of the fenestra. The tissue gradually coalesced with the membrana tympani secundaria. The other half of the fenestra was covered by cheesy pus. The scala tympani behind or really internally to the membrana tympani secundaria was almost completely filled with the same granulation tissue (Wuch. 3) that projected from the enlarged medullary spaces, and was continuous with this. Both went over into what was left of the membrane covering the fenestra. This could be seen as a fibrous band extending from the medial towards the lateral wall of the fenestra until it was lost in the granulation tissue. Near the surface in the tympanum the granulations have undergone cheesy degeneration.

Sections in the immediate neighborhood of the fenestra rotunda showed granulation tissue covering the floor of the scala tympani, but the farther away from the scala the sections were taken, the less granulation tissue was present.

In those made through the axis of the modiolus, there was none of it to be seen, the dilated lymph channels being the only indication of the process. Farther up in the cochlea these also were normal but there was some dilatation of the blood-vessels of the periosteum and the bone. Sections through the aqueductus cochleæ showed that it also contained granulation tissue.

The most plausible interpretation of these microscopic conditions is that necrosis began in the lacunæ of the lateral bony wall of the fenestra coincident with which there was a formation of granulation tissue in the necrosed areas. This process of new formation had involved the outer surface of the membrana tympani secundaria before caries had progressed far enough in the bone to cause the membrane to become detached from it. As the process continued and caused dissolution of the fibres of the membrane the granulations found free access to the scala tympani through the fenestra.

Histological changes very much like those described had also taken place in the fenestra ovalis (c. Figs. 2 and 3), and, as at the fenestra rotunda, an invasion of the labyrinth had resulted. The stapes, though almost devoid of mucous membrane, was not displaced. The posterior and upper portion of its base to about its middle and the annular ligament were covered by proliferating mucous membrane (c. Fig. 3, Wuch., 1). The posterior and upper bony wall was necrotic. A very thin lamella separating the vestibulum from the granulations in the tympanic cavity remained. The base of the stapes was necrotic at the upper extremity. The annular ligament had been involved in an area of cheesy degeneration in front of and below the stapes (c. Fig. 2). Its former position was indicated by a narrow chink. This was separated from the vestibulum by the very much thickened periosteum. This thickening of the vestibular periosteum, which was due to an infiltration and also to increase in the tissue cells, had taken place only in the immediate vicinity of the fenestra ovalis.

The facial canal communicated through defects of its bony wall, the result of caries, with the tympanic cavity; posteriorly, with the aditus and with the cancelli of the spongy bone. Some of the defects were empty, while others were filled with detritus of the neighboring parts. The facial nerve appeared normal up to the bend. In the tympanum it was broken up into filaments, and only took on a diffuse stain; the fibres failing to react to Weigert's method. These degenerative changes had taken place in the nerve in its entire course through the descending portion of the Fallopian canal. Portions of the nerve were surrounded by cheesy pus. In other portions granulation tissue had pushed forwards and was in apposition with the nerve. One section through this tissue contained two typical miliary tubercles.

There was a carious defect on the medial side of the pyramid filled with products of necrosis. The stapedius muscle was absent. Remnants of its tendon were still visible. The recesses in the back of the pyramid were filled with cheesy pus.

The pathological changes in the aditus and antrum were identical with those in the tympanum. Dissolution of the cancellous tissue was particularly marked near the upper and external walls. There were several defects in the tegmen tympani. The horizontal semicircular canal was surrounded by healthy bone, as the medial wall had only suffered slightly from the necrotic destruction. The ampulla of the horizontal canal was closest to the diseased bone, but it had not been affected.

There were no other changes in the internal ear than those described in connection with the fenestra ovalis and rotunda. The auditory nerve was not affected.

This case, which corresponds in many respects to the ones described by Habermann, has a number of very interesting features.

The extent which the process had reached in so short a time is the most noteworthy. The child was barely three months old, and had showed no evidence of ear disease until a month before its death, when the ear began to discharge pus. The tendency to tissue proliferation and formation of granulations and polypi, which usually characterizes this destructive process in children (Bezold[1]), was not present in this case. The case rather resembled, or I might say was identical with, the tubercular otitis media of the adult.

It is difficult to say how the infection of the middle ear was brought about in my case; whether the bacilli entered the tympanum through the Eustachian tube, or through the circulatory system. The theory advanced by Habermann (*l. c.*), that the general atrophic condition of tubercular patients, which naturally also includes the tube, increases its lumen, and consequently also the danger of infection through it, seems plausible. There is no doubt that the ear trouble in this case preceded the general miliary tuberculosis, as evidenced by the microscopic examination of the organs involved.

As regards the invasion of the internal ear, we have seen that it had taken place through the fenestra rotunda and fenestra ovalis, but that the changes in the internal ear had been very slight.

The carious destruction of the bony wall of the fenestra rotunda had caused a detachment of the membrane covering up the opening on one side, in that way furnishing a free avenue by which the granulation tissue could enter the periosteum of the labyrinth. At the fenestra ovalis the delicate annular ligament had given way to a caseous degeneration. In both instances the endothelial layer (in one of the membrane, in the other of the annular ligament) had become thickened, averting a free communication between the perilymphatic spaces and the tympanum. The process would, without a doubt, have eventually involved this structure.

The infection of the dura mater, which had taken place through the petro-squamous suture, had remained localized.

The degeneration of the facial nerve below the geniculate ganglion corresponds to the clinical history of the case—paralysis of the entire region supplied by the nerve.

Unfortunately, we are deprived of a functional examination in this case on account of the age of the patient. It would, however, be natural to assume that the hearing was impaired. The destruction of the intrinsic muscles, the loose condition of the stapes brought about by partial destruction of its ligament, and the partial destruction of the membrana tympani secundaria, with the interposition of a mass of granulations, would all go to indicate this. The terminal distribution of the auditory nerve had nowhere been involved in the necrotic process, although the very thin wall of the cochlea indicates the imminent danger of an early invasion of the cochlea.

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Explanation of the Plates.

FIG. 1.—A vertical section of the petrous bone through the anterior portion of the tympanic cavity. The section is almost parallel to and behind the modiolus of the cochlea. It shows the carious condition of the walls of the cochlea, cochleariform process and tegmen tympani.

At the floor of the scala tympani of the first turn of the cochlea the granulations are to be seen which have originated in the wall of the fenestra rotunda (W).

Wind. I, II, III : first, second and third turns of the cochlea.
Sc. v. : Scala vestibuli.
Sc. t. : Scala tympani.
D. c. : Ductus cochlearis.
Pr. c. : Processus cochlearis.

FIG. 2.—Section through the highest part of the promontorium including the fenestra rotunda and the fenestra ovalis (section almost at right angles to upper border of petrous bone) shows the points of invasion of the internal ear, the degeneration of the facial nerve and caries of its bony wall as well as caries of the floor of the tympanum.

Can. fac. : facial canal.

Por. ac. int. : internal auditory canal.

Vest. : vestibulum.

Can. n. p. amp inf : canal for branch of auditory nerve supplying lower ampulla.

Lig. a. : annular ligament.

D. : defect in annular ligament.

P. : hyperplasia and infiltration in the periosteum of the vestibulum.

Stap. : stapes with its antertor crus.

Pr. : promontorium.

M. m. : enlarged medullary spaces.

Lam. spir. : lamina spiralis.

Lig. spir. : ligamentum spirale.

Membr. tymp. sec. : membrane of the fenestra rotunda showing its detachment from the lateral bony wall and how its end becomes broken up into filaments to terminate in the granulation tissue.

Wuch. 1. : proliferation at the upper border of the fenestra ovalis. Caries of the bony wall.

Wuch. 2. : proliferation in the fenestra rotunda showing its inward invasion.

Wuch. 3. : proliferation in the scala tympani.

C. : caries of the wall of the fenestra rotunda.

G. G. : dilated blood-vessels in the granulation tissue.

K. K. masses of cheesy material.

Fig. 3.—Parallel section to the former, but taken more posteriorly, through the fenestra ovalis.

Shows the changes at the fenestra ovalis, degeneration of the facial nerve and caries of the tympanic cavity.

Stap. fp. : base of stapes with caries on its tympanic side.

Stap. k. : head and crura of stapes.

Wuch. 2 : tissue proliferation below the fenestra ovalis. (A continuation of the tissue represented in the previous figure Wuch 2.)

For the explanation of the rest of this figure, see Fig. 2.

PAPILLOMA OF THE SEPTUM NASI.

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(*With three figures on text-plate I.*)

FEW cases of true papilloma of the nose are recorded in literature. The following case is an illustration of this form of intranasal growth, and presents certain points of interest which appear to justify its publication.

J. B., fifty-two years of age, a gamekeeper, presented himself at the Ear and Throat Department of the Royal Infirmary, Edinburgh, on September 1, 1896, complaining of complete nasal obstruction, swelling of the right side of the nose, and some interference with the sight of the right eye. He gave the following history: In the summer of 1893, rather more than three years before the date of examination, he began to notice that there was some stuffiness in the right nostril; two or three months later, he received a severe blow on the nose, but he suffered no further inconvenience, save for some temporary pain and hemorrhage. This feeling of stuffiness gradually increased, and in the summer of 1895, two years after the onset of his symptoms, he noticed a swelling protruding from the right nostril.[1] In November, 1895, he received a second blow on the nose, being struck with the stock of a gun. Shortly after this injury, he observed some fulness of the right side of the nose externally, *i. e.* ten months before his examination. This swelling gradually increased in size, the obstruction of the right nostril became more marked and finally complete while the protrusion from that nostril became more evident. There were occasional attacks of hemorrhage and a constant discharge from the right side. During the last year, the left nostril has become completely occluded, the sense of smell has been entirely lost, and the sight of the right eye has latterly become interfered with, along with a tendency for the tears to trickle over the cheek. The patient has always enjoyed good health, and has been a strong, active man.

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[1] The tumor, with microscopic preparations, was shown at the meeting of the Laryngological Society of London, December 9, 1896, and is the case very briefly recorded in the Transactions of that Society.

On examination, the right side of the nose was seen to bulge prominently and form a considerable swelling extending on to the cheek, and reaching upwards as far as the inner canthus of the eye; it did not pass on to the forehead nor did it cross the middle line of the nose. There was no discoloration of the skin covering it. On palpation it was found to be of a soft, semi-fluctuating nature. Presenting at the right nostril, and more evident when the tip of the nose was tilted up, was a mass which completely filled up the vestibule and prevented the introduction of the speculum. Its surface covered with mucous membrane and resembling in appearance the lining of the nasal cavaties, showed no evidence of ulceration nor did it appear distinctly nodulated. In consistence it was fairly firm, and a probe passed between it and the ala, without the use of force, could not be inserted to any appreciable extent. In the left nostril, nothing was visible, but the septum was markedly deviated to the left. Examination of the fauces revealed no mass dependent behind the velum palati, nor was there any bulging of the palate forwards. Posterior rhinoscopy was very unsatisfactory, but nothing was felt in the naso-pharynx on digital examination : there was no bulging of the hard palate or anterior wall of the right antrum. There was no glandular enlargement.

The age of the patient, the size of the growth, and its recent more rapid increase, its soft consistence, in conjunction with the occasional attacks of hemorrhage, favored a diagnosis of malignancy, notwithstanding the healthy appearance of the man, and the absence of glandular enlargement. The absence of any expansion of the nasal bones, of any swelling in the nasopharynx and of any protrusion of the right eyeball, showed that the tumor was not growing from the base of the skull and was therefore probably suitable for complete removal. The eyes were examined and no lesion was found.

Professor Annandale being at that time in charge of the department, I asked him to see the patient; he took a similar view of the case and kindly admitted him to his wards. On September 5th, Professor Annandale operated by means of an incision commencing at the right inner canthus and carried down the side of the nose round the right ala and through the centre of the upper lip. The skin was dissected back as far as was necessary, and the right nasal fossa was then opened into; the tumor was thus exposed occupying the whole of the fossa. The superior, middle, and inferior turbinated bones of the same side had disappeared, absorbed by the pressure of the growth, but the antrum was not invaded. The great bulk of the tumor lay free in the cavity of the nose, and was attached to the bony septum about its middle by a somewhat broad base.

The whole of the mucous membrane covering the right side of the septum was dissected off and the central portion of the bony septum was removed along with the tumor. The removal of the mucous membrane was found necessary on account of the presence of several small accessory buds hanging by their pedicles from it and distinct from the main mass. Bleeding, which was considerable during the operation, was controlled by means of pressure; the skin flap was replaced and sutured and the wound healed rapidly. At the date of writing, four months after the operation, the patient was perfectly well and an examination of the nose revealed no evidence of any recurrence. Nasal respiration was free, but the sense of smell remained absent, as was to be expected after so complete a removal of mucous membrane. The sight in the right eye had improved, and there was no longer the same tendency for the tears to trickle over the cheek. There was a slight falling in of the bridge of the nose due to the removal of the portion of the bony septum.

The tumor, about the size of a small orange, resembled a typical cauliflower mass, and measured six and a half inches in circumference (Fig. 1). Its weight, including the portion of the septum to which it was attached, was one and a quarter ounces.

Microscopical examination showed the structure to be that of a true papilloma, consisting of a delicate branching connective tissue framework containing many blood-vessels with ill-defined walls, and everywhere covered with many layers of epithelial cells distinctly demarcated from the subjacent tissue. There were no mucous glands present. In one or two places there was a breaking down of the line of demarcation between epithelium and stroma, and distinct evidence existed of an invasion of the former into the connective tissue of the tumor. It was interesting also to observe where a small area had not been exposed to pressure, that the normal ciliated columnar type of epithelium had not been replaced by the stratified squamous variety.

A point of very considerable practical bearing existed in the presence of the several small accessory growths distinct in their origin from the main tumor but of similar structure and springing from the mucous membrane of the septum by slender stalks. These small buds might readily be overlooked, more especially in these cases where the tumor can be snared through the anterior naris, and continuing to increase in size, be looked upon at a later date as recurrences.

As already stated, this form of intra-nasal growth is comparatively rare, though it would appear to occur much more frequently than it really does, because many writers, following the nomenclature of Hopmann, have applied this term to the papillary hypertrophies, which are much more commonly met with in the nasal fossæ; it is on account of this that much confusion has arisen. These hypertrophies are situated on some part of the middle or inferior turbinated bodies, usually the latter, while the adjacent part of the nasal floor or septum may occasionally be involved. Though macroscopically there may be sometimes considerable difficulty in differentiating the papillary hypertrophy from the true papilloma, an examination with the microscope will reveal a structural difference, which will prove to be the most reliable means of diagnosis.

The hypertrophy is characterized by the presence of all the constituent parts of the mucous membrane covering the turbinated bones. The folds, which along with the depressions, give to the surface its papillary or mulberry-like appearance, show no evidence of budding or branching, but each communicates directly with the central mass of the hypertrophy. The surface is covered by the normal epithelium of the part, which is not thickened, but forms a more or less uniform layer upon the surface.

The greater part of the overgrowth is composed of a connective tissue stroma in which lie many venous sinuses and here and there small clusters of mucous glands. All these points may be observed in Fig. 3, a drawing of a microscopic section of a mulberry hypertrophy of the posterior end of the inferior turbinal kindly sent to me by my friend Dr. G. J. Palen of Philadelphia. The points of distinction between this and a true papilloma are readily seen if a comparison be made with Fig. 2, taken from a microscopic section of the tumor described above. In addition to the rarity of such tumors, and the fact that they differ histologically from the papillary hypertrophies, it has been found that they usually grow from the septum of the nose, so that there is at once an important distinction in their seat of origin. In the *New York Med. Journ.*, December, 1891, there is a valuable paper on Nasal Papillomata by Dr. Jonathan Wright, in which the differential structure of these growths is described, and the literature of the subject carefully reviewed, while in the *Lancet*, December 8, 1894, Mr. de Santi has a similar paper. As it is needless here to recapitulate what has already been written, I shall content myself with relating briefly the few cases of papilloma of the septum which have been reported since 1894.

Mr. CRESSWELL BABER (*Trans. Laryn. Soc.*, London, April 10, 1805) showed a patient, aged thirty-six, from whom he had removed a mulberry-like tumor, attached by a broad base to the floor of the left nasal cavity and septum, and projecting into the vestibule. The microscopical examination of a portion of the growth removed, is described as showing "hyperplasia of structure." This patient had been previously operated on for a similar growth in the same situation, which had been pronounced to be a papilloma.

WEIL, at a meeting of the Vienna Laryngological Society, May, 1895, showed a large papilloma of the septum from a woman sixty-seven years of age; this was examined microscopically by Zuckerkandl, and the diagnosis that had been made was confirmed.

Dr. JONATHAN WRIGHT describes in the *Transactions of the 17th Ann. Congress Amer. Laryn. Ass.*, 1895, a similar tumor, which grew in the left nostril of a young woman twenty-eight years of age. After removal with the cold snare, the point of its attachment by means of a narrow pedicle was found to be to the upper part of the cartilaginous septum. In structure it closely resembled the tumor described in this paper. At the same time he stated that he had examined histologically a similar tumor removed by Dr. Arrowsmith from the nasal septum of a child of five and a half years of age. I append a table of references to those cases in which microscopic examination has been made.

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A CASE OF OTITIC PYÆMIA CURED BY EXCISION OF THE THROMBOSED INTERNAL JUGULAR VEIN.

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Translated by Dr. A. B. Kibbe, Seattle, Washington.

ACCORDING to the collection made by Körner, and cited on page 78 of the second edition of his book, the internal jugular was tied in 41 of 79 cases of sinus disease operated upon. Among these 41 cases there are 4 in which large portions of the vein were excised on account of extension of the disease. The cases were those of Ballance, Parker, Pritchard, and Voss. Of these, two were cured, those of Parker and Pritchard, and two died, those of Ballance and Voss. The two cured cases indicate that even in those extensive thrombo-phlebitic processes which include the jugular, a prospect of saving the patient is still present. To these I can add a third, ending in recovery, which in many ways appears to be worth reporting.

Patient, F. M., a large strongly built man, aged twenty-five, always previously healthy, consulted me March 12th, on account of a purulent discharge from the left ear which had existed since childhood. Examination showed slight sensitiveness to pressure between the tip of the mastoid and the angle of the jaw. No change in appearance of integument in the vicinity of the ear. Small amount of offensive reddish discharge in meatus. Drum hard and hammer not visible. Instillation of HO brought masses of epidermis into the lumen of the meatus. No fever, but the patient complained of frequent headache accompanied by a sense of numbness in the head. A radical operation was proposed and accepted, but postponed at the request of the patient for several weeks. April 13th, the patient again presented himself, saying that severe headache had again set in, that he had had several chills and felt sick. Temperature that evening 41.5° C. The discharge from the ear had almost entirely ceased. An operation appearing to be urgent he was sent to the hospital, and, on April 15th, the operation was performed, exposing the field according to Zaufal. In chiselling away the posterior wall of the meatus a cholesteatomatous mass the size of a small walnut was encountered extending anteriorly as far as the tympanum and filling the dilated antrum, posteriorly reaching to the lateral sinus. In removing the mass, a large perisinuous abscess was evacuated ; after exposing the spaces of the middle ear and removing the granulations and cheesy masses present, the sinus was more extensively bared. Its wall being discolored in places and covered with granulations, it was difficult to differentiate it in its peripheral course from the dura, which was also covered with granulations. It being necessary to expose all the diseased area of the dura, the posterior cerebral fossa was exposed over a space of several centimetres. Following the sinus still farther centrally nearly to the jugular foramen, its wall gave way, giving vent to a large amount of pus. After splitting the sinus wall in its long axis, a probe was introduced both centrally and peripherally, without encountering a solid thrombus. The question to be decided now was whether or no the jugular should be ligated. Owing to the loss of blood and the fact that the advisability of this procedure is still an open question, it was decided to await the results of the present operation and to undertake the ligation later should it be indicated. The large cavity in the bone, as well as the sinus, was plugged with iodoform gauze and the usual dressing applied. Temperature that evening, 38.5° C., and the patient's general condition good. *April 16th.*—Slight chill at noon, temperature 40.4° C.

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[1] Read before the Otological Section of the Meeting of German Naturalists and Physicians, Frankfort a. M., Sept., 1896.

April 17th.—Chills at 9 A.M. and 6 P.M., cough and bloody expectoration. Slight sensitiveness to pressure below angle of jaw, though not greater than usual after such an operation. No swelling in neck and no cord could be felt.

April 18th.—Chill lasting twenty-four minutes, at 2 A.M. The bloody expectoration still persists, but with negative pulmonary findings. A slight jaundice has developed. Ligation of the jugular seeming to offer the only hope of saving the patient, the operation was undertaken. Baring the vein at the level of the upper edge of the thyroid cartilage, its natural blue color was noticed to be lacking, it being of a whitish color. Careful palpation showed it to be soft, with no evidence of adhesions or periphlebitis.

Having placed the two ligatures around the vessel, it was cut between them. To my astonishment, yellowish particles of a thrombus oozed out. Going farther down, the same thing again occurred. There remained, therefore, nothing to be done but to extend the cutaneous incision as far as the clavicle, draw aside the sterno-cleido-mastoid muscle and bare the vein as low down as possible. A double ligation was then placed around it once more, and this time the incision gave exit to a few drops of blood. The entire mass ligated, however, still contained thrombus masses, but of a redder color. The entire length of the vein from the border of the thyroid cartilage to a point close to where it empties into the innominate, was then excised. The wound was closed above by two sutures, the lower portion being left open and drained. Cultures made from the thrombus showed streptococci predominating. Between this date and the 24th, several chills occurred. On the latter, an abscess in the cheek ruptured spontaneously into the mouth. Several days later a pus collection in the lower lid was evacuated by incision, and, on the 9th of May, another abscess was opened at the angle of the jaw. From this date recovery was gradual, and the patient left the hospital June 25th. Owing to the severity of the general disease the treatment of the ear was exceedingly difficult, yet the result as regards that organ was very good. No effort was made to obtain a persistent opening back of the ear, as a portion of the mesial wall of the cavity was formed by the contents of the posterior cerebral fossa, which were better protected by a firm cutaneous cicatrix. The patient has been at work since the 1st of August. The hearing power is the same as prior to the operation.

It is most remarkable that there were no evidences in the neck of the extensive disease of the internal jugular. To this condition Crockett has called attention.[1]

The abscesses in the left side of the face must be taken as an evidence of a thrombo-phlebitis of the facial. In Parker's case, previously mentioned, a portion of the facial was thrombosed, and was excised with the affected area of the jugular. Jansen recommends, after clearing out the sinus, if high fever persists, chills occur, or pus exudes from the bulb, to ligate the jugular and facial also, and slit the former as far as the base of the skull.

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[1] *Archiv für Otologie*, Bd. xl., S. 32.

With this recommendation I am fully in accord from my own experience, and particularly when the thrombosis of the jugular extends beyond where the facial empties into the former. According to the findings at this point, one may ligate or excise a portion of the vein if it be thrombosed.

With reference to the question of the time when the jugular was tied, I must acknowledge that, now looking back over the entire course of the case, it would have been more correct to have ligated at the time of the findings in the lateral sinus, though it is not certain that at the time of the first operation I should have obtained better results, as the evidences of jugular disease were wanting. In a similar case, however, I should deem it advisable to perform simultaneous ligation.

There is no doubt but that the chills which occurred after ligation indicated further absorption from the small portion of the thrombus below the lower ligation. A similar case, that of Clutton, is cited by Körner in which a portion of the thrombus was included in the ligation. Absorption from the secondary foci in the left cheek must be excluded, as there were the evidences of a thrombo-phlebitis extending backward in the area of the facial which was cut off from its cardiac connection.

From the whole course of the disease it is clear that the ligation, or rather the excision of the thrombosed jugular, did not directly preserve the patient's life, as it was impossible from the condition existing to completely exclude further transportation of infectious particles. It did, however, prevent the continued access of such masses into the circulation.

THE PATHOLOGICAL CONDITIONS IN THE MIDDLE EAR AND SPHENOID SINUS IN TRUE DIPHTHERIA.

By Dr. E. LOMMEL, Thièle.

Translated by Dr. A. B. Kibbe, Seattle, Washington.

THOUGH the complications of disease of the ears in measles, scarlatina, typhoid, tuberculosis, small-pox, and particularly influenza, have been treated of in a number of publications, diphtheria has to a certain extent been neglected, particularly with reference to the pathological anatomy of the ear affections. Under these circumstances it appeared practicable to add a further contribution to this question. The reports are particularly valuable, first, for the reason that more than one half of the cases occurred in 1896 during the existence of a severe epidemic of diphtheria in Basel, and second, because all temporal bones were dissected by Prof. Siebenmann.

In none of the cases was there a complication with scarlatina, and throughout the Löffler bacillus was demonstrated in the membrane either during clinical observation or post-mortem, both by cover-glass preparations and by culture.

So great a number of autopsy reports of the condition of the middle ear in true diphtheria has never before been published. In their arrangement we have followed the plan of Rudolf and Bezold, the first cases being those in which the duration of the disease was the shortest, hence the most severe.

Case i.—Hedwig M., aged nine months.

Diagnosis.—Laryngo-tracheal diphtheria.

Left Temporal Bone.—Acute otitis media purulenta. Pharyngeal tonsil moderately swollen and intensely red, as was also the mouth of the tube. Drumhead gray, lustreless, with macerated and partially detached epidermis. No perforation. Mucosa of bony portion of tube, tegmen tympani, and drumhead slightly thickened, œdematous, and injected. All spaces filled with thick pus. Cartilaginous tube pale, contains a little bloody mucus.

CASE 2.—Anna M., aged eighteen months. Admitted May 31st.

Diagnosis.—Pharyngeal diphtheria. Croup. Broncho-pneumonia. Nephritis. Small spot of flaky exudate in right tonsil (Löffler bacillus). Respiration 84, with evidences of stenosis. Tracheotomy the same day. Death June 3d.

Left Temporal Bone.—Otitis media purulenta acuta, non-perforans. Mucous membrane of antrum and tympanum intensely red and moderately swollen. Cartilaginous tube unchanged as low down as the pharyngeal orifice.

Microscopic Examination.—Pus from the tympanum showed *numerous diplococci in the capsules*, occasional chains of streptococci, and pus corpuscles.

CASE 3.—Karl J., aged three years.

Diagnosis.—Diphtheria of fauces and larynx (tracheotomy).

Left Temporal Bone.—Otitis media catarrhalis subacuta. Mucosa of pharynx greatly swollen. No diphtheritic membrane. Drumhead normal. Cavities of the middle ear free from secretion and without a trace of diphtheritic exudate. Diffuse redness of mucosa without swelling. Malleus and incus injected.

CASE 4.—Paul W., aged two years.

Diagnosis.—Diphtheritic laryngitis.

Left Temporal Bone.—Otitis media catarrhalis acuta. Mucosa of nasal cavities slightly swollen, covered with tenacious mucus with here and there slightly adherent fibrinous masses reaching as far as the opening of the tube, but not extending into it. Tympanum filled with tenacious mucus, antrum and aditus empty. The cartilaginous tube pale and coated with a small amount of mucus. No membrane.

CASE 6.—Sophie W., three years old.

Diagnosis.—Septic diphtheria of nares and fauces.

Left Temporal Bone.—Hemorrhagic otitis media catarrhalis. Hemorrhagic inflammation of sphenoid sinus. Opening of tube not clearly recognizable owing to greatly enlarged pharyngeal tonsil. Right cavity of sphenoid empty, slightly injected; left, contents bloody, with lumps of mucus. Drumhead unchanged. Upper half of bony as well as of cartilaginous tube, tympanum, and antrum but slightly injected. The mucous membrane shows with magnifying glass numerous ecchymoses.

CASE 7.—Hans W., aged twenty months.

Diagnosis.—Diphtheria of the fauces, larynx, and trachea. Grayish-white membrane adherent to tonsils. Klebs-Löffler bacillus.

Left Temporal Bone.—Otitis media diphtheritica catarrhal., inflammation of sphenoid sinus. Entire nasal cavity and pharyngeal tonsil covered with diphtheritic deposit. Tubal opening and promontory pale. Drumhead transparent. Tympanic mucosa pale. The cell above and anterior to the tendon of the tensor tympani shows diffuse redness, marked swelling, and is filled with a fatty, light-gray, croupous membrane. Sphenoid cavity very small and without demonstrable diphtheritic exudate.

CASE 22.—Johann Th., aged three and one half years.

Diagnosis.—Croup. Diphtheria of fauces.

Left Temporal Bone.—Normal in every respect. The pharyngeal tonsil, which is slightly hypertrophic, shows neither redness nor change in epithelial covering.

CASE 24.—Lydia H., aged eight months.

Diagnosis.—Diphtheria of fauces and larynx. Posterior wall of pharynx, uvula, and left tonsil coated with a thick membrane, in which Klebs-Löffler bacilli were demonstrated.

Left Temporal Bone.—Otitis media diphtheritica; pharyngeal tonsil slightly enlarged, but no evidence of diphtheritic membrane. Tympanum and antrum filled with thick pus. Diphtheritic membrane found in lateral and posterior cells of antrum only. Cartilaginous portion of Eustachian tube normal.

(Of the twenty-five reports the greater portion has been omitted owing to lack of space and to the fact that all valuable features are discussed in what here follows.—Tr.)

From the preceding, it is seen that disease of the organ of hearing, and particularly of the middle ear, occurs with uncommon frequency in true diphtheria. We may therefore almost establish the rule that otitis media *forms part of the clinical fiction of diphtheritic inflammation of respiratory tract.*

Among all the autopsies, but 1, case 22, showed a normal condition of the middle ear, while, in the remaining 24, all gave indications of participation of the ear in the general disease. The exceptions to the rule, therefore, are but 4%.

With reference to clinical observation, it is to be noted that the disease of the ear was rarely diagnosed intra vitam. Many explanations are to be given for this. Above all, it is to be observed that the onset of the ear disease was, as a rule, free from pronounced symptoms. In none of the cases was there a perforation of the drumhead through which the purulent discharge might have attracted the attention of the clinician. In addition, almost all the patients were so young that they could not have made known the disturbances in the ear.

An examination of the drumhead also could have given but little information relative to the condition of the middle ear, as it was remarkable how slight the affection of this membrane was. On 68% injection was totally absent.

Assembling the results of the autopsies in these 25 cases, we have the following:

1. In 1 case (4%) the middle ear was absolutely normal. It is noteworthy, first, that the interval between the commencement of the disease and its termination in death was so long (18 days); and, second, that the pharynx was free from membrane.

2. In 2 cases (8%) there was catarrhal closure of the tube, and in 1 of them catarrhal and hemorrhagic inflammation of the sphenoid sinus.

3. In 5 cases there was otitis media catarrhalis acuta, more or less severe, and without exudation. In 2 of these, in addition, a catarrhal and hemorrhagic inflammation of the sphenoid sinus, and in 1 a diphtheritic inflammation, as shown by the presence of a membrane.

4. Otitis media catarrhalis acuta, with non-purulent secretion occurred in 4 cases (16%).

5. In more than half the cases (52%) the contents of the tympanum were purulent. In 2 of this number a diphtheritic membrane was also present. These, therefore, should be classed as cases of otitis media diphtheritica. Microscopic

examination of case 2 revealed diplococci having capsules (a double pneumonia existed). In the other cases a bacteriological examination of the pus was unfortunately omitted.

6. Diphtheritic disease of the middle ear was demonstrated in 2 perforations (8%). The membrane was not examined histologically (Weigert's fibrin stain) nor bacteriologically. It showed, however, the character of true diphtheritic exudate, fatty, white, and adherent to the mucous membrane. Both presented the evidence of acute purulent inflammation.

The condition of the cartilaginous portion of the tube has an important bearing on the etiology of the affection of the middle ear. It is generally assumed (as shown by a glance at the literature on the subject) that acute otitis media in diphtheria of the pharynx is a process due to extension per continuitatem, and that the tube forms the path by which extension takes place.

In 21 of all our cases (84%), the interior mucous lining of the cartilaginous tube was normal. It is to be noted that occasionally the lumen contained some mucus though the membrane was normal. It is fair to presume that this mucus was not the product of inflammation, but that it was aspirated into the tube at the time of death. In the other 4 cases (16%) the cartilaginous tube was inflamed.

Case 12 is of particular interest, as here a diphtheritic exudate existed on the promontory of the tube. In spite of this, the middle ear showed no evidences of inflammation. The cases show *that participation on the part of the tube in the inflammatory processes is rare, and that, even though inflammation exist at each end, the middle of the tube remains unchanged.*

Under these circumstances it appears to be highly improbable that the process in the middle ear is simply an extension from the pharynx by way of the tube. On the contrary, it is much more plausible to assume that the disease in question is an affection of the bony cavities of the middle ear accompanying diphtheria, and that the identical relations exist which Bezold demonstrated in his researches in other infectious diseases. Comparing the changes in the middle ear in diphtheria with those found in other infectious diseases the following points are noteworthy:

In contrast to the views generally held, these processes usually pursue a mild and not a severe course, as Bezold found to be the case after measles. From his reports of autopsies which were critically studied by Rudolf,[1] it is shown that otitis following measles only exceptionally led to spontaneous perforation at the height of the general disease. In two cases, 12.5 %, a perforation was demonstrated on the post-mortem table. In the first of these, the findings indicated that it was due to a chronic inflammation existing prior to the general disease. In the second, in which an oblong perforation was found, a paracentesis had been made. In general, however, the process was of a more severe form in those cases of measles than in ours of diphtheria.

In typhoid, and particularly in scarlatina, the condition is usually a severe one. In the six autopsy reports published by Bezold[2] in reference to disease of the ear in typhoid, otitis media catarrhalis was found once, while in all the others the affection was a suppurative one, accompanied by perforation of the drumhead. It should be observed, however, that these cases were particularly severe, and had exhibited during life symptoms of ear disease. The same author has published, as a further contribution, in a short notice of the results of a number of dissections of temporal bones from typhoid cases which during life had presented no symptoms referable to the ears. Comparing them with our reports, we find that scarcely half presented any change in the condition of the middle ear, and in only 12½ % was there any suppuration. In all probability, therefore, otitis in diphtheria is a more severe complication than when it occurs during typhoid.

Scarlatinal otitis is generally recognized as more severe, and its destructive action is plainly evident from the work of Burckhard-Merian.[1] This author had at his disposal eighty-five cases of ear disease following scarlatina. Of these 36 % showed acute middle-ear inflammation without perforation, 40 % with perforation, and 24 % with destruction of the drumhead.

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[1] Rudolf und Bezold, "18 Sectionsberichte über das Gehörorgan bei Masern," *Zeitschrift für Ohrenheilkunde*, 1896.

[2] "Über die Erkrankung des Gehörorganes bei Ileo-typhus," *Archiv für Ohrenheilkunde*, Bd. xxi.

We believe in this contribution to our knowledge of the findings in the middle ear in diphtheria that we have substantiated a fact which has not generally been appreciated, namely, ***that these affections in the great majority of cases do not represent a genuine disease, but occur as one of the symptoms of a general infection.***

As an appendix, the findings in the sphenoid cavity may be summarized as follows:

In one case (4 %) no change was to be recognized. In three (12 %) the sinus showed moderate swelling and redness of the mucosa. Three times (12 %) it contained fluid but not of a purulent character. In one of these a croupous membrane was present. Three times (12 %) the contents were purulent. In the remainder of the reports no mention is made of the condition, probably as it was not developed.

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[1] Burckhardt-Merian, " Ueber den Scharlach in seinen Beziehungen zum Gehörorgan," *Sammlung klinischer Vorträge*, von B. Volkmann, No. 182.

A NEW METHOD OF TREATING [BY DIGESTIVE FERMENTS] DEAFNESS DUE TO THE SEQUELS OF CATARRHAL AND SUPPURATIVE INFLAMMATIONS OF THE TYMPANUM.

By Dr. COHEN-KYSPER, Hamburg.

Translated by Dr. A. B. Kibbe, Seattle, Washington.

THE pathological changes which, in chronic catarrh of the tympanum, may lead to permanent hardness of hearing frequently consist of a hyperplasia of the mucosa, due to epithelial deposits and proliferation of connective tissue, through which the functions of the ossicles are restricted. Analogous to catarrhal affections of other mucous membranes, this may terminate in a degenerative stage leading to shrinking, hardening, and thickening. A condition frequently found is one marked by the formation of bands and membranes due to adhesions between portions of the hyperplastic membrane in the narrow spaces of the middle ear. This form of chronic catarrh, one of the most common forms of incurable deafness, is designated as dry catarrh, otitis media adhesiva and frequently as sclerosis.

In recovery from chronic suppuration, among other causes of impaired hearing, the formation of cicatricial tissue adhesions etc., are frequent.

I have attempted to affect these usually irreparable processes by introducing into the middle ear solutions of ferments having the power to dissolve albumen, for the purpose of inducing a process of digestion of the hyperplastic material as well as of the connective-tissue products; to dissolve them or lessen their size and thereby render the conduction of sound more easy.

That organized tissue in vivo is capable of being digested is sufficiently well known. I may here call attention only to the experiments in which rabbits' ears and frogs' legs were introduced into dogs' stomachs through gastric fistulæ and completely dissolved. With reference to the particular form of tissue elements which here come under consideration, it has been demonstrated that the various forms of epithelium as well as connective and elastic tissue may be dissolved by digestive solutions, particularly of pepsin.

For such experiments the conditions in the middle ear appeared particularly favorable. First, we have a cavity for the most part surrounded by rigid walls in which the fluid is placed and in which it may exert its action for a long time. If it were merely possible to obtain a superficial action and only dissolve the small particles of tissue, we might think that even this would be of importance in improving the action of the sound-conducting apparatus. Further, the defective processes of circulation and nutrition which exist in the diseases in question predispose the bands, adhesions, etc., to solution by pepsin solutions. The theories relative to the production of the circular gastric ulcer assume such conditions, *i. e.*, disturbances of circulation in individual vascular areas that cause auto-digestion, while the normal mucosa is protected by the alkalinity of the blood.

I have carried on these experiments for nearly four years, in all directions and with a large amount of material at my command. At the outset there were many difficulties to be overcome, from the clinical side of the procedure as well as in reference to the choice and proportion of a thoroughly suitable solution, as our knowledge of these bodies is as yet defective, and for the purpose a series of difficult theoretic experiments was necessary.

Various ferments were tested. For example I worked one entire year with the vegetable ferment papayotin. Finally a definite and completely satisfactory solution for injection resulted from the work of Klug, of Budapest, " Experiments on Pepsin Digestion," which appeared in January of 1895.[1]

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[1] *Pflüger's Archiv f. Phys.*, 1895, Bd. lx.

He discovered a method, as simple as it was exact, of measuring by photometry the energy of digestive ferments and of making exact estimates of the concentration of the pepsin and of the hydrochloric acid and the difference in the pepsin from different animals. He found that the gastric juice of the carnivorous dog far exceeded in intensity as well as rapidity of digestive power that of the herbivorous cattle and the omnivorous swine. Pepsin from the dog acts so rapidly that in from twenty to forty minutes peptone could be demonstrated in the solution, while pepsin from the other two sources required four hours for the same. This astonishing rapidity of action also showed itself in clinical application. In certain cases when suppuration had ceased, in which the solution came in contact solely with cicatricial tissue, the patients frequently stated within ten minutes that their hearing was better and that they had a feeling as though a veil had been lifted from the ear. Objectively I could also demonstrate an increase in the hearing distance.

With reference to the concentration of the solution, Klug found that, contrary to previous assumptions, the best action was found in a very small percentage of pepsin, and for dog's pepsin in the proportion of 1 to 10,000, in which strength I use it. With reference to its preparation in a suitable solution, everything necessary can be obtained from Klug's article. I may only add that the solution must be *chemically pure* and previously passed through a bacteria filter. The percentage of hydrochloric acid should not be .6 %, which Klug found to be the best for digestion. Empirically I arrived at a concentration of .15 %.

With reference to the mode of injection, I was first obliged to make each experiment on the cadaver. The always uncertain method by way of the tube was at the outset excluded, as it was not solely necessary for the solution to reach the middle ear, as with other medicaments which are occasionally used, but that a minimum amount should be brought as exactly as possible in contact with the articulations of the ossicles. Experiments in this direction were made on one hundred and fifty cadavers, which by the courtesy of Dr. Simonds were placed at my disposal. Fluid gelatine was injected into the tympanum, allowed to solidify, and the dissection then made in order to determine the action of each method of injection. In this way the desired information was obtained relative to the most suitable method of operation, the proper amount of solution, and the correct position of the patient.

I believed originally that it was necessary to submerge the sound-conducting apparatus as deeply as possible under the fluid, also those parts lying in the upper tympanic space, the bulk of the hammer and of the incus, and had found a suitable procedure, preliminary notice of which I have already published.[1]

If the injection be a simple one, made through the drumhead with the ordinary injection needle, the tympanum will in general be only so far filled with the fluid as lies within the area of the drumhead. The entire upper portion of the cavity will remain free. Of the ossicles, only the area of the stapes will be touched. But as this portion of the sound-conducting apparatus is the one which plays the principal rôle in the foregoing diseases, one might restrict himself to this alone if it replaces all other complicated and difficult procedures. The injection is to be made as near as possible to the stapes—that is, posterior to the manubrium mallei, in the vicinity of its upper half, or between the rim of the drumhead and the descending limb of the incus, if this can be seen through the membrane and there is sufficient space to make the puncture.

I have sufficiently satisfied myself that in this way the niche of the fenestra ovalis with the stapes will always and with certainty be filled by the injection. As a rule, the connection between the stapes and incus is covered by the fluid, and often the tendon of the tensor tympani is reached. If the drumhead is strongly retracted and the posterior fold prominent, one may make the puncture at this latter point or use a needle with an anterior curve. It not rarely occurs that the pressure of the injection opens the Eustachian tube and a portion of the solution escapes into the throat. In spite of this, however, according to observations on the cadaver, the spaces in the region of the stapes retain a sufficient quantity owing to their capillary character and this even when the tympanum is quite empty. Plugging the Eustachian tube with a bougie is therefore unnecessary. Lately I have tried the plan of making a counter opening above the injection puncture to give exit to air and superfluous fluid. In cases of adhesion of the drumhead or narrowing of the tube, this is of course superfluous.

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[1] *Münch. med. Wochenschr.*, 1893, No. 34.

The amount of injected fluid, according to experiments on the cadaver, which is sufficient to cover the stapes is from *one half to one decigramme.* As a larger quantity may act more intensely and our purpose be achieved with more certainty, I inject from two to three decigrammes according to the size of the drumhead. Larger amounts are unnecessary, and on account of the danger of too great an irritation are to be avoided. It is of course advisable to warm the solution, taking care to avoid too high a temperature for fear of destroying the pepsin. The position of the patient should be that which is most convenient for the physician, —the head on a low pillow and turned to the opposite side. After the injection, the patient should remain in this position about an hour.

The instrument employed is a Koch syringe modified to meet the requirements of ear instruments. The canula is bent at an angle, the needle toward the point as thin as possible, the bevel short; a piece of rubber tubing between the bulb and glass cylinder is indispensable to steady and safe handling. The bulb should be compressed by an assistant, who should watch the flow of the solution in order that the air following does not drive the fluid out of the tympanum.

Although simply an injection, the procedure is always delicate, often fairly difficult. It is of prime importance that a first injection be successful, as in case of failure a repetition cannot be made at once owing to the danger of excessive irritation. It should not be done, in my opinion, before the lapse of several months. Hemorrhage is to be prevented, for fear of neutralizing the gastric juice (pepsin ?

—Tr.). On this account, the descending strip of cutis from the upper wall of the meatus, which carries the large vessels, should be avoided. The use of an anæsthetic is often advisable as the pain is frequently quite severe.

The procedure in cases where suppuration has ceased and a perforation exists is usually very simple. Here I have confined my attention to the stapedial connections, and in individual cases adapted the treatment to them. In complete absence of the drumhead, or when there is a large perforation, it is sufficient to use a few drops, enough to fill the cavity. A plug of cotton is then placed in the meatus to prevent the dissipation of heat, and the patient maintains the recumbent position for about an hour. The same procedure is adopted in total adhesion of the drumhead when puncture and injection are impossible. When the perforation is too small or unfavorably situated, one may use a blunt canula with a bent tip, or puncture back of the hammer.

In the cases with large perforations following cessation of suppuration, one may frequently draw fairly accurate conclusions relative to the mode of action of the pepsin solution. Particularly suitable are cases in which the solution comes in contact with cicatricial tissue, when the stapes is embedded in a cicatricial membrane and the mucosa completely covered with epidermis. Here all associated action may be excluded; the conditions being precisely similar to those in which digestive experiments are carried on in the incubator.

It is unquestionable, therefore, from these cases, *that an actual digestion of cicatricial tissue takes place.* It is scarcely possible to explain in any other way the fact that in such cases immediately after the end of the procedure the hearing improves fivefold, and, above all, remains there. Within one half to one hour all the result possible is usually reached. From this it is apparent that what interferes with the conduction of sound must doubtless be very small particles of tissue. In a few cases in which the injection was made through the intact drumhead the puncture was converted into a small round hole.

In more than half the cases of chronic catarrh, the course is almost free from reaction, as far at least as findings on the drumhead are concerned, indicating that pepsin solutions as used do not in general produce any extensive irritation. In cases giving the best results, nothing is to be seen on the day following the injection except a slight congestion of the drumhead around the point of puncture. This may persist for a few days. Usually the improvement in the hearing is perceptible on the following day, and at the same time a lessening of subjective noises occurs, if any be present. In the balance of the cases, the appearances of an acute irritation of the drumhead develop, the traces of which are usually still to be seen from one to two weeks. In spite of this the results may be observed as early as the day following the injection, particularly subjectively, and develop further in the next few days with the decrease in the symptoms of irritation. Frequently improvement first manifests itself at the end of about a week. In a few cases two or three weeks passed. Among these were such as showed no symptoms of reaction. Occasionally a decrease in hearing power occurs, lasting usually a few days, rarely more than a week, but which in no way impairs the prognosis with reference to a definite result. From all this it is apparent that the course is throughout an irregular one. In general we may say that the improvement will be the more marked the earlier it appears, and that the chances are more unfavorable the later it is in showing itself.

As an evidence of irritative action, one symptom should be noted. It frequently happens a short time after an injection that a serous exudate into the tympanum occurs, as shown by its flowing into the external meatus. Following an injection of pepsin solution, this exudate is always slight. After the use of papayotin, however, it is much more copious, the meatus often being filled and the cotton used for plugging saturated. Here we are concerned less with an inflammatory exudate than with a transudation. It is to be presumed that this discharge occurs more frequently than is directly perceptible. It is probable that it often remains in the drum cavity, not flowing out of the puncture.

In injections of pepsin solutions, the exudate being of alkaline reaction neutralizes the weak hydrochloric acid, and exhibits further irritation. In this is found an explanation of the assumption that only the superficial particles of tissue are dissolved.

After-treatment is unnecessary if no reactive symptoms develop. Should such symptoms appear, they may be rapidly relieved by the cautious use of the catheter.

In cases in which suppuration has ceased, reaction occasionally recurs if the mucosa is not completely coated with epidermis ; in no case lasting more than fourteen days, however.

Of the manifold pathological processes in these affections of the tympanum which come under consideration, we are concerned solely with hypertrophic processes and connective-tissue formations particularly in the niches of the fenestræ and with the stapedial connections. As far as the solutions for injection are capable of acting and, as we have seen, they only attack superficial layers of tissue, a result is possible. All other causes of impaired hearing are excluded, as well as similar processes in the upper spaces of the tympanum, and all those severe and extensive pathological changes, particularly the manifold varieties of bone disease, chalky deposits, anchylosis of the articulations, etc. ; above all, coexisting labyrinthine disease. ***The treatment is only indicated in cases in which whispered speech is still heard near the ear.*** In this degree of deafness, when existing in both ears, the patients state that the conversation of one person can be heard if it is plainly spoken, and not too low, while they are completely excluded from understanding that of a number. The treatment should only be adopted when the effects of the catheter have been exhausted or it has been found to be useless.

A total of 150 cases of such forms of chronic catarrh were treated, of which 40 were bi-lateral. Eighty cases were treated with injections of pepsin solutions. In the remainder, other forms of ferments were used. The number improved was more than two thirds of the total number treated.

This includes the cases in which both ears were affected, and in which but one was improved. It is noteworthy that the same result was obtained in a large number of experiments with other ferments, particularly with papayotin applied in various ways (45 cases), and with various solutions of pepsin from the pig (about 20 cases). The results were always improvement in about two thirds of the cases.

Following the classification of the individual forms of chronic catarrh, according to Walb,[1] we have, as cases suitable for treatment, first, that of hypertrophic catarrh, characterized by loss of transparency, thickening, grayish-white discoloration, and, generally, retraction of the drumhead. Next, those forms which are to be looked upon as the last stage of simple chronic catarrh, marked by pronounced retraction of the drumhead, with prominent posterior fold, frequently partial atrophy and thinning of the same, and adhesions to adjacent inner parts. That affection for which the term sclerosis is reserved, in a clinical sense, is to be excluded. As is well known, the views of authorities are divided at the present time as well relative to the inclusion of this disease among the catarrhal affections of the middle ear as to its clinical limitations. Generally, they are to be summed up by those in which a pronounced progressive tendency to deafness exists with negative finding on the drumhead, or to those which show hyperæmia of the promontory visible through the membrana tympani. Anatomically, an isolated anchylosis of the stapes may be assumed, which is to be looked upon, according to Politzer's recent examinations, as a consequence of primary disease of the bony labyrinthine capsule. Further, those forms are to be included which plainly bear the character of a primary atrophy of the mucous membrane, as shown by the presence of the same process in the naso-pharyngeal space.

In contrast to this, it was shown throughout that the cases which offered the greatest prospect of success were those in which a permanent improvement in hearing followed the use of the catheter, or the removal of hyperplastic material from the naso-pharynx. Of twenty such patients, all were improved by injection. When the results of previous treatment were not particularly brilliant, those produced by the injections were, as a rule, more marked both subjectively and objectively.

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[1] Krankheiten der Paukenhöhle und der Tuba Eustac. Schwartze's *Handb. der Ohrenheilk.*, Bd. ii.

The degree of improvement in hearing is, in general, estimated by the extent to which it was impaired; that is, it is the more marked the better it was preserved. In general, the improvement was decidedly regular, being about twice to three times the hearing distance for whispered speech.

The value of the procedure is increased by the improvement in subjective noises and other nervous disturbances. In these cases the treatment acts in the same sense as on the deafness. If this was improved, those diminished or disappeared entirely. It several times happened that the hearing remained unchanged, while the subjective noises continued, and *vice versa*.

Observations on the duration of improvement, as far as it was possible to make these on cases in part from dispensary practice, showed, in general, favorable results. In keeping with the character of the affections, observations, extending over a period of from two to three years, showed, now and then, that the improvement was partially or totally lost. The course was, however, always retarded. In several, hearing in the operated ear remained stationary, while in the other it decreased.

Forty-five cases in which suppuration had ceased were treated, of which two thirds were benefited. Here too the improvement amounted to an increase of from twice to three times the previous hearing distance. The results were always permanent.

In concluding, I must emphasize the fact that this procedure is still a therapeutic experiment. In individual cases a successful result may be promised with a certain amount of probability, but the prognosis must always be a reserved one. In cases of chronic catarrh the procedure is often painful, and narcosis frequently necessary. Otherwise, it is free from danger, and beneficial in the majority of cases.

THE HISTORY AND NECROPSY OF A CASE OF FIBRO-SARCOMA OF THE NASO-PHARYNX AND MIDDLE CEREBRAL FOSSA. ASSOCIATED CONDITIONS: ETHMOIDITIS, EMPYEMA OF THE SPHENOID CELL, OTITIS MEDIA, PACHYMENINGITIS.

By THOMAS HUBBARD, M.D., Toledo, O.

(With a figure in the text.)

The complexity of the title is truthfully suggestive of complex pathological conditions, and it is difficult to present them in their proper relation and sequence. The patient, a State official of fifty, was a man of exemplary habits. There was no history of specific taint, and repeated thorough therapeutic tests were made. He was the father of a large family, the youngest being about two and one half years, and all are healthy. He was afflicted with urinary calculi many years ago, and had one attack of peritonitis.

Prior to an attack of the grippe, in April, 1895, he was apparently in excellent health. The symptoms, as described, suggest a general, but not very severe, infection of the ethmoid, and probably sphenoid, cells of the left side, followed by a subacute inflammation of the middle ear, for which he consulted Dr. W. K. Rogers, of Columbus, O., who has kindly given me notes of the case. Evacuation of the tympanum, by paracentesis and catheterization, gave decided temporary relief from the pressure and deafness. Only sero-mucus was found. The pain was referred to the ear at this time. On May 29th he developed paresis of the left external rectus oculi, which subsided in about a month. During the summer the tympanum was repeatedly evacuated for relief of pain and tension, and each time with positive relief. The symptoms of accessory sinus inflammation did not persist beyond the acute stage.

In the fall there was noticed an œdematous swelling in the naso-pharynx above the left Eustachian prominence. This was reduced by operation, and a fragment having been examined microscopically was found to be merely œdematous connective tissue. About this time he first complained of pain in the left parietal region. Dr. E. B. Dench, of New York, was consulted in December, and I am privileged to quote from his notes:

"I first saw the patient on December 8, 1895. At that time he was complaining of severe pain, referred to the left temporal region, tinnitus, and a feeling of fulness in the left ear. Upon otoscopic examination, the left tympanum was seen to contain fluid. The presence of fluid was confirmed by catheter inflation. This latter operation was performed with some difficulty, the rotation of the instrument into the mouth of the tube being apparently impeded by the presence of some foreign body. Upon rhinoscopic examination, the vault of the pharynx was seen to be occupied by a growth, most extensively developed in the region of the left Eustachian orifice, and presenting the general appearance of exceedingly vascular lymphatic tissue. Owing to the age of the patient, the presence of any increased amount of lymphatic tissue in the pharyngeal vault was hardly to be expected. For this reason, I considered the mass of a neoplastic nature. The pressure exerted by the tumor upon the walls of the Eustachian tube seemed sufficient to explain the effusion of fluid into the tympanic cavity. Upon examination of the anterior nares, a few polypi were found in the middle meatus, upon the left side. I immediately removed a fragment of the naso-pharyngeal growth, and placed it in the hands of a pathologist for a microscopical examination. According to this investigation, the tumor was found to be a fibro-lymphoma.

"In the course of a few weeks, the patient returned to his home, and I advised his attending physician to remove the growth from the naso-pharynx. As the microscope had shown that the growth was not malignant, it seemed quite probable that it might be of inflammatory origin. This opinion was strengthened by the condition of the left nasal cavity, the polypoid degeneration of the mucous membrane in the middle meatus being strongly suggestive of an ethmoiditis. This, by extension, might have involved the sphenoid cells, giving rise to the condition of the naso-pharynx already noted. Until the microscopic examination had indicated that the naso-pharyngeal tumor was non-malignant, I believed it possible that any intra-cranial inflammation present might have been secondary to a malignant growth within the pharyngeal vault. Intra-cranial inflammation seemed also possible, as the result of suppurative inflammation within the ethmoid and sphenoid cells. I was confident that the condition of the middle ear was entirely secondary to the naso-pharnygeal lesion. I was also sure that the severe headache and the pronounced constitutional symptoms, from which the patient was suffering, could depend neither upon the middle-ear inflammation, nor upon the extension of such a process to the intra-cranial structures.

"The suggestions in regard to treatment were carefully followed. The patient obtained no relief,—on the contrary, he became steadily worse."

Dr. Rogers further reports that the head pains gradually extended from the left parietal region to the occipital and later to the left frontal region. He suffered constantly with acute exacerbations of severe lancinating character, but he was attentive to business most of the winter. The right side of the head became equally painful with the left, and he developed considerable rigidity of the post cervical muscles. There was slight febrile reaction at times. During a period he was in Dr. E. J. Wilson's private hospital. The diagnosis of pachymeningitis had been made by Drs. Rogers and Wilson, and mercurials and iodides, with most favorable general conditions, were faithfully tried. There was temporary improvement in the pains and cervical rigidity. The ear continued to annoy him, and there was still some relief following evacuation of the tympanum.

In March, 1896, about one year from the primary sickness, he again consulted Dr. Dench, and I quote further from his notes :

"About three months after my first examination, I saw the patient a second time, and, on account of the severe, persistent headache, suggested the advisability of an exploratory craniotomy. The condition of the left middle ear was essentially the same as at the time of my first examination, fully confirming the opinion that this was a complicating lesion simply. The patient firmly believed that some operation upon the ear itself would relieve the distressing symptoms from which he was suffering. I advised him, however, to have nothing done in this direction, as I was confident that no inflammation of the middle ear could give rise to the symptoms of which he complained."

An exploratory trephining was done by a surgeon in Philadelphia. The opening was made at the left temporo-parietal suture, posterior to a vertical line from the external auditory meatus. A wire loop was used to separate the dura, but no indications were found for opening it. He was relieved a week or more from the excruciating pains. During his treatment at St. Joseph's Hospital he once more had a very thorough course of potassium iodide, but in June he returned suffering quite as severely as before. A purulent discharge from the naso-pharynx was noted, and occasionally a sero-mucous discharge from the left ear.

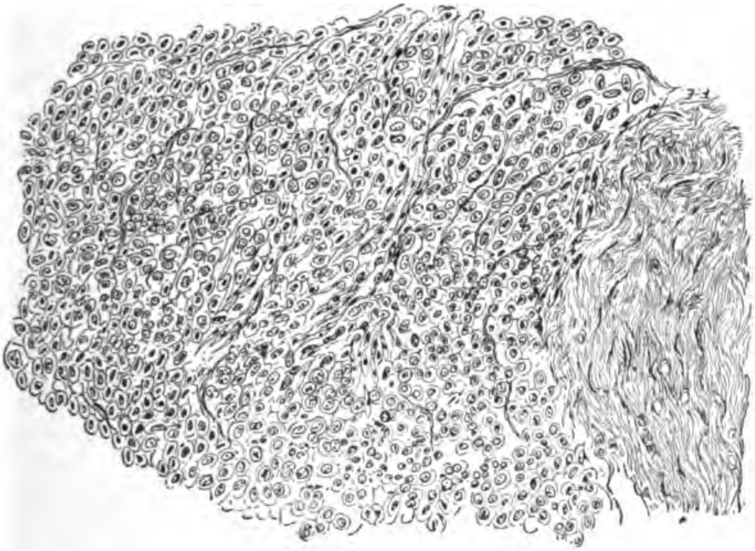
From this time he was under the care of Drs. E. B. and C. M. Harrison, of Napoleon O., who give the history of the development and increase of the focal symptoms. Pain was referred to the whole cranium, and the scalp became exquisitely tender. The stiffness of the neck was constant and very pronounced. The left eye at times protruded from paresis of all its muscles. Vision was much reduced, but the patient was not aware of it until tested. He would lapse into a condition of profound coma, with subnormal temperature and depressed heart action. For days at a time death would seem imminent, and then he would rally, and, after taking nourishment, would present a clear mind and cheerful spirits.

I first saw him in consultation with Drs. Harrison and James Donnelly after he had aroused from an unusually severe period of coma. He was very weak but perfectly rational. Examination was necessarily brief and directed mainly toward ascertaining the condition of the left temporal bone as the possible source of infection, and endeavor to determine the existence of an operable intra-cranial abscess, as these were regarded as the only conditions that could possibly be relieved. There was evidence of congestion of the tympanum and a slight sero-mucous discharge. There was no indication of mastoid disease. Our patient was so thoroughly exhausted that the naso-pharyngeal examination was interrupted, and we went no farther than to determine that there was a small mass of fibro-adenoid tissue and muco-purulent discharge into the throat. The left palato-pharyngeal muscles were paralyzed. At this time the ocular muscles acted normally, but the left pupil was very small and rigid. It should be added that his temperature was never above normal, and usually below. The bowels were very sluggish, and he had occasional attacks of cerebral emesis. There was some spinal irritation shown by variation in the functions of the bladder, retention and incontinence being noted. The skin became very dry and harsh.

He died October 20th, about a month after our examination, and we were granted a *necropsy*, to be limited to the cranial contents. The trephined area was filled in with dense fibrous tissue continuous with the dura. About one inch posterior there was a bulging ecchymosed nodule about half an inch in diameter. Had the operator trephined over this spot he would possibly have been misled into opening the dura, but we found membranes and brain perfectly normal underneath. There had been pachymeningitis covering an area laterally about one inch either side from the superior longitudinal sinus and antero-posteriorly the middle third of the parietal region. The adhesions between the meninges were quite dense, but no softening or pus was observed. The dura over the temporal bone was perfectly normal except at the apex of the petrous portion, where it was somewhat softened and congested. The substance of the cerebrum and cerebellum was normal. On removing the tegmen tympani we found sanious sero-mucus filling the tympanum and mastoid cells. There was no erosion of the membrane. Flakes of muco-pus were found in the antrum. The bony trabeculæ of the cells were soft and spongy, quite in contrast with the firm white tissue of the right mastoid. As the sectioning progressed toward the median line the tissue was found more spongy, and sanious pus exuded. The exact condition of the Eustachian tube was not determined. When the chisel entered the sphenoid cell considerable pus escaped. It had no odor nor was there any erosion of the membrane.

The bony vault of the naso-pharynx having been partially removed we came upon a tumor about the size of an almond. It occupied rather the left vault. Further dissection revealed a similar growth in the left middle cerebral fossa contiguous to the sphenoid cell and extending as far laterally as the foramen ovale. The intra-cranial tumor was firmer and extra-dural, the membrane involved being very red and softened. The bone contiguous to both masses was very soft and spongy but did not seem to be a part of either growth. The tumor removed was independent of the pituitary body, occupying the sella turcica, but it may have been contiguous to it. The location of the growth readily accounts for the disturbance of the eye functions.

The tumors were sent to Dr. Jonathon Wright, of Brooklyn, for examination. The report is as follows: "Microscopical examination shows it to be made up of small round cells, of small spindle cells, and of fibrous tissue. There are very few blood-vessels. Where they occur their fibrous coats are thickened. The round cells are supported by an intracellular framework of fibrous-tissue stroma. The areas of round cells predominate, but in places the chief characteristic is the spindle-cell formation and in others the dense-fibrous tissue. (See accompanying figure.) Both specimens show practically the same structure. Diagnosis: "*Small round-celled fibro-sarcoma.*"



In reviewing the history of this case, it is apparent that although there are some points not settled by the necropsy yet the findings are very instructive. It seems to me that syphilis can be excluded, and I believe that all who treated him concur in this. The question as to the primary source of meningeal infection is important. The location of the meningitis near the superior longitudinal sinus and the absence of temporal meningitis suggest that the ethmoid or sphenoid cells may have been the source. But it is probable that the primary inflammation of these accessory sinuses subsided and that the purulent condition of the sphenoid at the necropsy was due to the neoplasm, since the apex of the temporal bone was in a similar condition. The meningitis was a very confusing factor in the diagnosis.

It is important to note that in centrally located malignant disease of this character, aural or nasal accessory-sinus symptoms may predominate at different stages, and since both of these are operable regions the determination of the primary cause is of great importance. It seems quite clear that the symptoms with the exception of the meningitis can be referred to the neoplasm and hence the conservative management of the case was fortunate for all concerned.

EXTENSIVE, BUT NON-INFECTED THROMBOSIS OF SEVERAL SINUSES OF THE BRAIN, AND OF THE JUGULAR VEIN, DUE TO OPERATIVE INJURY OF THE LATERAL SINUS; RECOVERY.

By Dr. R. HOFFMANN of Dresden.

Translated by Dr. J. A. Spalding, Portland, Me.

Mrs. B., aged forty, consulted me in April, 1895, for pain in the left ear and left side of her head, which, as she said, began a month ago after an inflammation of the ear following influenza. The treatment, conducted by her local physician, consisting in perforation of the *Mt*, and daily cleansing of the ears, removed for a time the pain, which, however, soon returned, and required repeated perforations of the *Mt*. The day before she consulted me, she had an attack of nausea, which was referred to a gall-stone. She had been sleepless and restless for a month. A year before, she had suffered from otorrhœa in the right side, which lasted for some time, but gradually ceased after using Turkish baths.

The patient is rather anæmic, and holds her head to the left and backward. The *Mt* is pale, and shows a small perforation. There is very little discharge, and the meatus is apparently healthy. There is a suspicion of swelling over the mastoid, and an enlarged gland can be distinctly felt in the inferior maxillary articulation. The tip alone of the mastoid is very sensitive to pressure and percussion.

The functional tests of the left ear showed aërial and bone-perception for watch and fork; low voice close to the ear. Right ear normal.

The ophthalmoscope showed no abnormity in the fundus of the eyes.

Although the suppuration had probably extended beyond the tympanum, I thought it wisest at first to repeat the paracentesis, and to rely on the use of ice-bags, locally, behind the auricle. A free incision was made in the *Mt*, though but little pus escaped, a strip of gauze was inserted, and ice-bags applied.

The patient returned in a week, reporting that although improved at first by the operation, and the ice-bags, the pain was now as intense as ever. Inspection showing the perforation smaller, but no pus, an operation on the mastoid was proposed but declined. The patient was willing, however, to submit to renewed perforation of the *Mt*, and to the use of the ice-bags as before. Furthermore, six leeches were applied, and the perforation in the *Mt* again opened. Between April 19th and 26th ice, leeches, and morphium were resorted to, without avail, the headache, pain in the ear, and in the tip of the mastoid remaining violent.

After renewed examination the patient consented to an operation on the antrum, which was performed April 29th, discovering a small antrum filled with pus and granulations. *On scraping a small granulation in the posterior superior angle of the field of operation, copious hemorrhage from the sinus ensued.* The sinus was tamponed with iodoform gauze.

Much to our surprise, the operation had no effect on the intensity of the pain; on the contrary, it was asserted to be more violent than ever on the following days, and it extended over beyond the middle line to the right side of the head. Moreover, the patient complained of pain in the left side of the neck, along the course of the jugular vein, in the left arm and shoulder, and in the right arm, and added that her legs felt as if they did not belong to her and were weary. She walked, when able to leave her bed, with a shambling gait.

Every inch of the surface of the skull, shoulders, arms, and neck was exquisitely sensitive to the slightest touch, causing her to scream with pain during the examinations.

There was no swelling over the course of the jugular, but the patient suffered from an obstinate constipation, which scarcely yielded to purgatives and clysters.

Ten days after the operation the bandages were renewed, and everything seemed to be following a normal course to recovery, but though there was no swelling over the parts or indication of deep-seated trouble, the headache persisted with all its former intensity. The patient lay abed most of the time, with her head to the left, and when she occasionally sat up, she invariably held her head between her hands. The head could not be turned to either side without calling forth exquisite pain.

A new symptom, in the next few days, of paræsthesia in the right hand, with a sensation of crawling of ants over the skin, induced us to call a consultation with a specialist in nervous diseases, who found nothing to go by except the hyperæsthesia, whilst examination with the ophthalmoscope failed to show any abnormity in the eye as a symptom of cerebral lesions except redness of the right optic papilla, and fulness, with tortuosity of the veins ; no œdema of the eyelids.

The pulse varied from hour to hour, sometimes as high as 140°, and then as low as 58° in a minute. The temperature remained normal most of the time.

In the following week a distinct *right-sided* facial paralysis was first observed. The headache was more intense than ever, vertigo was complained of, and then double optic neuritis with retinal hemorrhages were plainly seen with the ophthalmoscope. The right ear was carefully examined to see if from the same any facial paralysis could originate, but it was normal, and the hearing was remarkably acute ; tones from 64 vibrations to 40,000 v. being clearly perceived.

About the middle of May, the patient was suddenly attacked with delirium, involuntary evacuation of urine and fæcal matter, and repeated vomiting. The temperature was normal, and the pulse only 50 or 60 beats in the minute.

All of these symptoms, together with constant pain in the head, swelling over the jugular vein, and *crossed facial paralysis*, indicated either a thrombosis or an abscess, and a further operation became an urgent necessity.

An incision ten centimetres long on a level with the upper insertion of the auricle and extending forward over the region of the inferior maxillary articulation, and backward over the junction of the lambdoidal, parietal, and mastoidal sutures, was made under anæsthesia on May 20th. A second incision was then made five centimetres in length, perpendicular to the first, and starting directly over the middle of the auricular insertion. A large piece was then chiselled from the squamous portion of the temporal bone, and the dura uncovered. Next, from six to eight punctures, one of them at least four centimetres deep, were made directly into the substance of the brain, but no liquid except abundant cerebro-spinal fluid was evacuated. After this negative result the rest of the squamous portion above the upper wall of the auditory meatus and the upper wall of the meatus itself, were chiselled away and the dura removed, but still no pus. Finally, the opening was still farther enlarged, the base of the mastoid and the upper part of the bone chiselled away, and in this way the transverse sinus in a portion of its transverse and ascending course laid bare, as well as a portion of the posterior cranial fossa.

The sinus appeared of a yellow color at the bend, whilst backward it was rather blue. An experimental puncture showed thick, dark blood, and an incision a brownish-red thrombic mass.

The result of the operation at first was excellent, but in a day or two more the patient complained of bodily pain, pulling in the arms, headache, and paræsthesia of the right arm. The pulse was about 100, but temperature normal.

Some days after the operation the patient was more quiet, but on the fifth day began to complain of pain in the right ear extending all over the head and into the neck. The facial paralysis remained about the same as before.

The next set of symptoms, making their appearance about ten days after the operation, consisted of complaints of disturbance in the abdomen. Colic was excruciating, according to the patient's assurances, and the entire abdomen was exceedingly tender to the touch. Oil clysters and laxatives soon relieved these symptoms, but the ophthalmoscope still showed traces of optic neuritis of the descending type, and œdema of the eyelids was very evident.

After a week of comfort the patient began again to complain of pain in the head and operated ear as well as in the neck, which still seemed much swollen over the course of the jugular. The incisions were frequently dressed, and all seemed to be progressing well.

By the middle of June the improvement was again interrupted by complaints of pain, now chiefly in the back, then in the neck, occasionally in the head and neck. The facial paralysis had by this time mostly disappeared, but there were still some disturbances of motion in the right hand. The left pupil was larger than the right, but both reacted equally to the light. The ophthalmoscope revealed a haziness in the margins of both discs, but all hemorrhagic extravasations had disappeared. The right upper lid still lagged a little behind that of the right eye.

In July, 1895, the optic papillæ remained slightly indistinct, there were no traces of paræsthesia; the incision in the mastoid had healed over; the orifice of the operation was still quite deep, but the patient was discharged. In June, 1896, the patient presented herself, quite recovered.

This paper is already so extended, that a *résumé* may hardly be called for, and yet there are some important points to which attention ought to be called, and that I will now do in as brief a manner as possible. Here, then, was a case of influenza otitis, in which repeated paracenteses of the *Mt*, ice-bags, and leeches failed to bring the expected relief. An operation on the mastoid process becoming an urgent necessity, we opened up cavities filled with, and probably much enlarged by, pus. Now, it seems that, after the infection thus became established in the mastoid, the aditus to the antrum closed, so that the suppuration in the tympanum tended to cease. The repeated paracenteses of the *Mt* temporarily compensated for the closure of the aditus, and thus afforded temporary relief, whilst the rapid closure of the artificial perforations in the *Mt* was followed with rapid recurrence of the unfavorable symptoms.

The morbid process finally extended to the sinus, so that, on removing a granulation in the field of operation, a copious hemorrhage ensued. The pain did not cease after the operation, but additional cerebral symptoms, such as a slow pulse, vertigo, nausea, somnolence, delirium, opposite facial paralysis, and optic neuritis, together with inflammation of the jugular vein, ensued. For these reasons, a second operation became imperative, and, in performing this, we discovered a thrombus in the transverse sinus and jugular vein. The right cavernous sinus was also probably involved, as exemplified by the œdema of the eyelids of the right eye, and the optic papillitis.

Œdema of the lids, as well as optic papillitis, has been observed in a few cases in which the *cavernous sinus* was not involved,[1] but the ophthalmoscopic alterations in our case, with minute hemorrhages in the retina, indicated some obstruction to the circulation in the district of the ophthalmic vein.[2]

It was impossible to tell whether there was a thrombus in the mastoid emissary also. As the latter connects the sinus with the post-auricular veins, and as there was swelling over the mastoid at the second operation, I agree with Dr. Af Forselles[3] that the œdema was rather inflammatory than congestive.

During the operation, the dura was tense, though without visible pulsations, and some cerebro-spinal fluid exuded on making the incision. As the thrombosis extended, the cerebral symptoms increased, but with the unloading of the fluid they gradually diminished.

Amongst the cerebral symptoms I will remark that the headache was exceedingly violent, spreading in every direction down into the neck, shoulders, and arms. The hyperæsthesia of the skin, pain on moving the head, and even after passive motion of the arms, were also marked, but they mostly disappeared after the second operation, though complaints about the condition of the head itself did not cease till the patient's departure from the hospital.

Soon after the second operation *hysteria complicated the case exceedingly*, with a train of symptoms resembling those that had preceded, but now they would come and go with great rapidity, and often change many times in the same day. Another peculiarity consisted in the patient's gait, which can be described by no other word than "shambling." Yet during all the time there were no visible alterations in the skin, or in and about the joints.

It is quite unusual to meet with so severe cerebral symptoms after injury to the sinus, but considering the anatomical relations, and the extensive thrombosis, they are not inexplicable. Moreover, together with the symptoms due to general pressure, we had a *focal symptom* in the shape of crossed facial paralysis, which gave us reason to think that possibly an abscess had associated itself with the thrombus. And since Koerner[4] has stated that an otitic brain abscess always lies close to bone over the ear affected, the abscess was supposed to lie in the temporal lobe of the brain, and the facial paralysis was referred to the reflex action of the abscess on the internal capsule of the brain.

It may be remarked that abscesses after *acute* aural suppuration are rare, but they have been observed, as, for instance, in a patient of Bezold's,[5] who died of otitic cerebral abscess in forty-six days after the beginning of an otorrhœa, whilst Baginsky and Gluck[6] report distinct cerebral symptoms *twenty-two days* after an otitis excited by the presence of a foreign body in the meatus.

After all is said, however, the operation and the course of our case proved that our idea of a cerebral abscess was erroneous.

The facial paralysis began to disappear with the evacuation of the contents of the calvarium, and finally ceased with the gradual restoration of the circulation. Therefore we must refer the same in some way to the sinus thrombosis, and most probably to some hemorrhage thereby established. And in this we agree with Dusch,[7] who discovered in half of his cases of marasmic and congestive thrombosis ***hemorrhages in the brain or in its enveloping membranes.***

At one time we suspected, also, a peripheral cause for the facial paralysis. A basal affection was to be excluded because such a facial paralysis rarely appears isolated, and some other basal nerves would have been affected. The auditory nerve was normal, there was no middle-ear disease on that side, taste, expectoration, and the velum palati were normal, so that the only further possible exciting cause would have been a lesion of the facial outside of the Fallopian canal, and that possibly of a rheumatic origin.

Unfortunately we were unable to carry out the electrical examination which is so important for a differential diagnosis in these affections. And, additionally, in central facial paralysis it is not always the lower portion of the nerve which is alone affected at the start, but the oculo-motor branches also participate in the paralysis.

Furthermore, facial paralysis alone, without some affection of the extremities on the same side, is rarely seen in brain lesions except with limited circumscribed hemorrhages, in which case the general symptoms rapidly disappear, leaving the facial paralysis alone as the last of the hemiplegic symptoms previously present to a greater or less extent.

Or there are on the surface of the brain, or in the course of the medullary fibres passing from the cortex to the centres, *circumscribed and limited disturbances of continuity* upon which the isolated paralyses depend. Therefore, with the brain symptoms in our patient, it was natural to connect the two together. The manner in which the paralysis supervened, and its course after the operation, confirmed this view. For the paralysis came on with the increased cerebral symptoms, and also after distinct circulatory disturbances had been discovered with the ophthalmoscope, then decreased with the diminution in the brain symptoms, and as the ophthalmoscopic appearances approached nearer to the normal conditions.

The facial disturbance being isolated, the hemorrhage which caused it must have been small and not cortical, because the paralysis occurred without irritative symptoms, nor were there later any clonic convulsions.

Nuclear lesions of the facial mostly affect only the lower branch, because the nuclei seem to be separate, though there are exceptions, as noted in Möbius.

Another point to be mentioned was that, in times of joy or pain, the immovable half of the face participated in the mimic movements, as observed particularly by Nothnagel in well-marked facial paralysis of cerebral origin.

The temperature of the patient was almost invariably normal through the entire course of the case, which is in agreement with a non-infected thrombus.

To conclude: This was a case of injury to the transverse sinus followed with extensive thrombosis, with severe consecutive brain symptoms. Such injuries with bad results are rare, or at least but few cases have been reported.[1] When the injury is slight, and only a small portion of the sinus is laid bare, there is little disturbance in the circulation (Jansen[2]), but where the injury is extensive, and the sinus largely exposed, the thrombus may fill the entire lumen. Jansen has seen several cases, and once on both sides, but no worse symptoms were observed than a slight dizziness on arising from a chair, sensitiveness to pressure in the fossa of the inferior maxillary articulation, and a slight chill on changing the bandages. Brieger,[10] too, has seen a similar accident, but never associated with serious consequences. In one instance, however, owing to the abundant hemorrhage, the patient became very anæmic, and later suffered from Basedow's disease. Two other cases of my own caused by the sharp spoon recovered without relapse, but a third died, and a small thrombus was found, *though the lumen of the sinus remained patent.*

Knapp [11] speaks of one case with a good termination, but mentions, without, however, quoting authorities, that in other instances the result has been fatal. Rheinhardt [12] lost a patient after an endeavor to remove with a forceps a sequestrum lying on the sinus. The latter was ruptured, and the case terminated fatally from infectious thrombosis of the sinus and jugular veins, and subsequent meningitis. Steinbrügge,[13] Roosa,[14] and Kretschmann [15] also have published similar instances with multiple abscess in the lungs, pyæmia, and exophthalmus, the details of which can be found in the papers referred to in the bibliography appended.

Eulenstein's [16] case is doubtful because it is hard to say whether the sinus was injured by the sharp spoon, or the pyæmic symptoms were due to osteo-phlebitis present before the operation, and from which, as a result of the operation, the thrombus was set free.

Inasmuch as Brieger [17] and others mention that incised wounds in the sinus usually heal without alteration of the passing column of blood, the size and the sort of injury may have some influence on the origin and extension of the thrombus. In our case the dura was not split, but all the punctures into the brain made directly through it. This method has the advantage that, with a negative condition of things in the brain, we avoid infection of the contents of the calvarium with the infected incision of the mastoid process.

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4. KOERNER, *Die Otitischen Erkrankungen des Hirns*, 1896, p. 101.
5. BEZOLD, *Archiv f. Ohrenheilk.*, xxi., p. 36, Case 6.
6. BAGINSKY and GLUCK, *Berlin. klin. Wochensch.*, 1891, No. 48.
7. DUSCH, *Henle and Pfeiffer's Zeitsch.*, Series 3, Bd. vii., p. 161.
8. SCHWARTZE, *Handbuch.*, Bd. ii., p. 807, and JACOBY, *Archiv f. Ohrenheilk.*, Bd. xxi., p. 62.
9. JANSEN, *Archiv f. Ohrenheilk.*, xxxv., p. 279.
10. BRIEGER, THESE ARCHIVES, xxv., p. 343.
11. KNAPP, THESE ARCHIVES, x., p. 369.
12. REINHARDT, *Chirurgische Eröffnung d. Mittelohrraüme*, 88.
13. STEINBRÜGGE, *Deutsche med. Wochenschr.*, 1893, p. 432.
14. ROOSA, Reference *Archiv f. Ohrenheilk.*, Bd. xxxv., p. 103.
15. KRETSCHMANN, *Archiv f. Ohrenheilk.*, Bd. xxv., p. 125.
16. EULENSTEIN, *Monatssch. f. Ohr.*, 1893, p. 146.
17. BRIEGER, *l. c.*, p. 132.

THE CONDUCTING PORTION OF THE LABYRINTH.

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THE conducting portion of the auditory apparatus is invariably described as ending at the base of the stapes. By conducting is meant that part of the apparatus which mechanically transfers the sound waves to the perceptive portion. The perceptive portion must be limited to the brain and auditory nerve with its terminals. The branches of the auditory nerve end as hair cells inside the various parts of the membranous labyrinth; in the cochlea in connection with the organ of Corti on the membrana basilaris, in the saccule and utricle on the maculæ, and in the ampulla of each semi-circular canal on the crista acoustica. Therefore, before the sound waves can reach the nerve terminals from the base of the stapes they have to pass through the perilymph which fills the space between the osseous and membranous labyrinth, the membranous labyrinth itself, and the endolymph which fills the membranous labyrinth. Under which heading must these be physiologically classed? This also must be the conducting. The sound waves are simply transferred from a solid to a fluid medium. Developmentally this conducting portion of the labyrinth is entirely separate from the true perceptive portion. Therefore the point urged is that the conducting portion does not end at the stapes but *at* the nerve terminals.

If this true physiological division was more insisted upon one cannot help thinking that much light might be thrown on the physiology of hearing and on the pathology of ear diseases.

It is a suggestive thing to note that, in the saccule, utricle, and semi-circular canals the whole thickness of the membranous labyrinthine wall intervenes between the perilymph and endolymph; whilst in the cochlea the thin delicate membrane of Reissner alone intervenes: this shows that in the cochlea it is necessary that every slightest wave should be transferred to the nerve endings on the membrana basilaris, while in the saccule, utricle, and semi-circular canals such a thing it not so important. In the cochlea, too, in order to prevent too great shocks to the nerve terminals, a special safeguard is present in the scala tympani and the round window with its bulgeable membrane, the sound waves being able to expend themselves.

The perilymph and endolymph apparently must be kept at a certain tension for the proper performance of their conducting function; the former fluid is in communication with the sub-arachnoid space through the aqueductus cochleæ, and the latter with the saccus endolymphaticus, a blind pouch in the dura mater lying against the posterior surface of the petrous bone, by means of the aqueductus vestibuli. It will therefore be seen that the labyrinthine tension is closely connected with the intra-cranial and must alter with it. Here a wide field for speculations and theories is open in connection with this subject. One cannot help being struck by the comparative clinical resemblance of glaucoma to so-called Ménière's disease. May not increased tension of the endolymph or perilymph, due to excessive secretion or obstruction to outflow or any other cause such as hemorrhagic effusion as was found by Ménière in his classical case, be responsible for so-called Ménière's disease or symptoms. Speculation on this theory leads one to imagine that operative interference for the relief of increased labyrinthine tension by puncturing the outer labyrinthine wall may, in the future, be within the realms of practical surgery. It may be said that such theorizing is futile, but the difficulty of carrying out careful pathological examinations in labyrinth diseases is so great, that it is almost justifiable. Other obscure cases of deafness again may find a pathological solution in diminished tension due to sclerotic or vasomotor changes of the apparatus which secretes the perilymph or endolymph; this is especially so in cases which undoubtedly commence in the middle ear or in which the middle ear first shows signs of being affected, and in which the internal ear subsequently becomes affected, as tested by the tuning-fork. With regard to tuning-fork tests, so far as is known increased bone conduction indicates some affection of the external or middle ear, there being no evidence to show that this test includes the labyrinthine conducting portion. According to the division of the auditory apparatus advocated in this paper, and which I venture to think is the true physiological one, increased bone conduction should be said to indicate trouble in the external or middle ear, and not, as is so often said, of the conducting apparatus.

A CASE OF CONGENITAL AURICULAR SINUS WITH RECURRING INFLAMMATION. OPERATION. RECOVERY.

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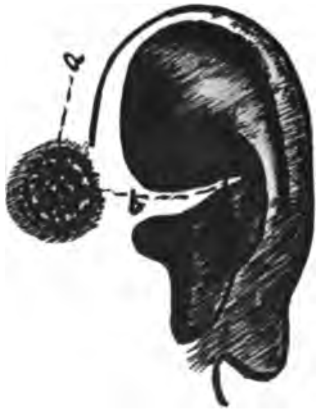
(With a text-figure.)

E. W., aged twenty-three years, female, came to the Royal Ear Hospital in March, 1896, complaining of an ulcer about the size of a sixpence, with an indurated base, situated immediately in front of the auricle at the junction of the helix with the cheek; the history being that a small opening had existed in that situation all her life, with periodical attacks of inflammation and the formation of an abscess which, on bursting or on being opened, left an ulcer which healed up on simple treatment. Several operations and treatment of different sorts had been tried with no benefit.



A probe was found to pass through an opening at the lower part of the ulcer in various directions: directly inwards, parallel to the meatus for about an. inch; upwards and slightly backwards in front of the helix (*a*); and backwards and downwards through the whole length of the crista helicis (*b*).

Under simple treatment the ulcer healed, leaving a small orifice.

In May, 1896, under chloroform, the different divisions were freely laid open; no distinct lining wall could be found, but anything suspicious was cut away; pure carbolic acid was freely applied to the whole wound, which was packed with double cyanide gauze and allowed to heal from the bottom. In June it had completely healed. The patient came to report herself in September; no further trouble had been experienced. The scars lying chiefly in the grooves were scarcely noticeable. A small circular depressed scar was present in the same position on the other side.

SYSTEMATIC REPORT ON THE PROGRESS OF OTOLOGY IN THE FOURTH QUARTER OF THE YEAR 1896.

BY DR. ARTHUR HARTMANN.

Translated by Dr. C. ZIMMERMANN, Milwaukee, Wis.

ANATOMY OF THE EAR.

388. WITEBSKY, M. Embryological studies on the sound-conducting apparatus of the axoloths. *Inaugural Dissertation*, Berlin, 1896.

389. RAWITZ, B. Hearing organ and brain of a white dog with blue eyes. *Morphological Investigations of G. Schwalbe*, vol. vi., No. 3.

390. BÜRKNER. On anatomical conditions in microtia and atresia of the auditory canal. *Transactions of the German Otological Society*, Fifth Meeting at Nürnberg, Jena, 1896.

391. GRUBER, Prof., Vienna. A girl, aged six years, with malformation of the auricle. *Monatsschr. f. Ohrenheilk.*, Bd. xxix., Heft ½.

392. BROCA and LENOIR. Remarks on a case of persistent cartilage of Merkel, with absence of the external ear of the same side. *Journal de l'anat. et de physiol.*, xxxii. Year, No. 5.

388. WITEBSKY made further examinations with reference to the statements of Parker, Reichert, and Wiedersheim, according to which the operculum is a detached portion of the labyrinthine capsule. His results were quite different. He found the operculum with the columella to be genetically one formation, originating from the hyaloid arch, *i. e.*, the upper portion of the second branchial arch of the visceral skeleton. KRAUSE.

389. Through Blumenbach and Darwin, we know that cats

and dogs with white hair and blue eyes are deaf. Rawitz had the good fortune to examine such a case anatomically: A young Dalmatine dog, which had been totally deaf. Semicircular canals normal on both sides. Cochlea greatly diminished in size; the right consisted of 2, left of only 1½ whorls; the cochlea of the normal dog has 2½ whorls. Corti's organ, Reissner's membrane, and stria vascularis are wanting. The basilar membrane, the spiral ligament, and the membrana tectoria are more or less changed. The cells of the spiral ganglion and the fibres of the auditory nerve seem greatly degenerated. The changes on the left side are more marked than on the right. Therefore the left temporal lobe of the brain was smaller than the right. It was hardly one third of the normal size, so that the caudal portion of the gyrus hippocampi lay freely exposed between cerebrum and cerebellum. KRAUSE.

390. In BÜRKNER's case of lacking external auditory canal, the os tympanicum, the former annulus tympanicus, was totally wanting. Besides, there were various changes in the tympanic cavity. Normal labyrinth. KRAUSE.

391. Girl aged six years. Left auricle in general normal. Right side of face markedly smaller than left. Roof of mouth very concave. Oral fissure drawn to the right. The right auricle consists of a roundish flap of skin with broad insertion, which must be considered as an excessive lobulus. An oblong prominence supported by cartilage is found above it. Mastoid process at its normal place. No trace of an external ear opening can be found. Catheterism of tube can easily be performed. Nothing definite can be made out in regard to the condition of the middle ear. Hearing of the left ear normal, of the right impaired.

KRAUSE.

392. A child aged three months. Slight abnormities of right auricle; middle ear normal. The left external meatus is missing; the auricle is replaced by two or three small prominences of the skin. The muscles of this side of the face are greatly diminished. In the interior of the mandibula, the cartilage of Merkel is preserved. The Eustachian tube is preserved, and leads into a cavity closed on all sides, the rudimentary tympanic cavity, in which rudimentary ossicles are found. The hammer is in connection with the cartilage of Merkel and the ligamentum stylohyoideum. The anvil is greatly reduced in size. The internal ear shows normal conditions. From these changes it appears

very probable that hammer and anvil originate from the first pharyngeal arches. KRAUSE.

ANATOMY OF THE NOSE.

393. SEYDEL, O. On the nasal cavities and the organ of Jacobson in land and mud turtles. *Festschrift zum siebenzigsten Gebrutstag von Carl Gegenbaur*, Bd. ii., Leipzig, 1896.

394. TIEMANN, H. On the formation of the primitive choanæ in mammals. *Verhandlungen der physikalisch-medicinischen Gesellschaft zu Würzburg*, N. F., Bd. xxx.

395. BERGEAT, H. The asymmetry of the osseous choanæ. *Archiv für Laryngologie u. Rhinologie*, Bd. iv., Heft 3.

393. Only the following chief points of the voluminous work may be mentioned : The nasal cavity of the land turtles is similar to that of the lower amphibia. It consists of the pars olfactoria, which corresponds to the nasal cavity proper of the amphibia, and the pars respiratoria with the organ of Jacobson. In mud turtles the organ of Jacobson is highly developed ; the entire pars respiratoria is covered with neuro-epithelium. Two glands, the external and medial nasal gland, are in connection with the nasal cavity. The peripheral olfactory organ of land turtles has a more primitive structure than that of the mud turtles. KRAUSE.

394. TIEMANN'S article confirms the views held by HOCHSTETTER and KEIBEL, that the formation of the primitive choana is secondary. At first it is a cul-de-sac, formed by the contact of the medial and lateral nasal processes. In front the mesoderma grows between the united epithelial surfaces, behind remains an epithelial bridge, the membrana bucco-nasalis, which breaks, later on furnishing a communicating opening, as primitive choana, between nasal cavity and the primitive oral cavity. The supramaxillar process does not take part in the formation of the primitive nasal cavity. KRAUSE.

395. BERGEAT reports his investigations on over 100 skulls of animals, and about 1200 human skulls. Asymmetry of the choanæ is very frequent in the anthropomorphous, as Bergeat found in all the skulls that he examined. In man, a distinction must be made between the asymmetry of the arrangement of the choanæ in proportion to the whole skeleton and the asymmetry between the choanæ themselves. According to TOEROCK, 50 per

cent. of all skulls are asymmetrical. Bergeat rates the frequency of asymmetries of the right choana at about 10 per cent. The most frequent and characteristic type is that one pterygoid process is located more downward and outward than the other. More rarely this inclination outwards is limited to the basal portion. The asymmetry due to inclination of the pterygoid process inwards is very rare. The asymmetries seem to be congenital only in rare cases, in most they are acquired. In regard to etiology the author mentions the following points: 1. Unequal mechanical and static influences on insufficiently consolidated bones of the skull; 2. Primary irregularities of the circumference of the choanæ; 3. Secondary displacements of the sphenoid bone and vomer from asymmetrical growth of the skull; and 4. Anthropological influences—*e. g.*, in 5 out of 6 skulls of Abyssinians and natives of Upper Egypt, the right choana was elongated upwards, without other displacements of cranial bones. KRAUSE.

PHYSIOLOGY OF THE EAR.

396. DENNERT, H. On the perception of noises. *Arch. f. Ohrenheilk.*, Bd. xli., p. 109.

397. LUZATTI. The hearing field in space; contribution to the physiology of the hearing organ. *Ann. des mal. de l'oreille, du larynx*, etc., 1896, 12.

396. DENNERT reached the conclusion, from former investigations, that sounds and noises are perceived by the same nervous apparatus. This view, which probably is in accordance with the opinion of most physiologists, he wants to confirm again by the following experiment: If a thin wooden rod, which is held between the teeth, is stroked at its free end, a tone is perceived, which increases in height, if the rod is pushed farther into the mouth. Finally a uniform high-pitched noise is heard. This is produced by the same source and in the same manner as the tone. The point of transition of the latter into the former lies in different persons at different places of the uppermost portion of the scale. As to the influence of the quantity of sound on the hearing sensations, D. emphasizes, that in the unit of time a larger quantity of higher tones comes into play, since the number of oscillations is greater. BLOCH (Freiburg).

397. LUZATTI attempted, on 40 persons, to establish a hearing field analogous to the normal field of ophthalmologists. The

source of sound, a watch, is placed on a rod rotating in a vertical plane around a centre of rotation, fixed on an adjustable stand. The centre of rotation is brought, at a distance of 40 *cm*, into the same line with the axis of the auditory canal, and the watch is moved in the eight different meridians towards the centre until it is heard. L. found an ideal hearing field, from the different figures, of irregular form, according to the different hearing distance, which was greatest in the anterior superior meridian. L. attributes some influence to the varied formation of the auricle. He adds a résumé of the hypotheses advanced in regard to it.

ZIMMERMANN.

PHYSIOLOGY OF THE NOSE.

398. ZWAARDEMAKER, Utrecht and REUTER, Ems. Qualitative olfactometry. *Arch. f. Laryng.* iv., 1.

399. GOODALE, J. L. An experimental study of the respiratory functions of the nose. *Boston Med. and Surg. Journal*, Nov. 5–12, 1896.

398. The method of qualitative olfactometry of Z. and R. aims, with simple means, at a rapid diagnosis of anosmia in regard to the different species of substances and a reliable method of examination of those cases in which deviations from the rule have been found. For this purpose it was essential that: 1. The various kinds of odors were classified in a natural system. 2. From each group such substances had to be chosen which could be used in appropriate forms for the olfactometer of Zwaardemaker, *i. e.*, in solid cylinders or impregnated in tubes of clay. 3. To ascertain the olfactometric proportion of the single test substances to each other. ZARNIKO.

399. GOODALE, I. considers the action of the nasal mucous membrane upon respired air with regard to heat and humidity. He used an apparatus on the principle of the aspiration psychrometer. Goodale tabulated the results as determined by the psychrometer in four tables, comparing the experiment—A with cold dry air, B with cold damp air, C with warm dry air, and D with warm moist air, and giving in each table the temperature, relative humidity, absolute humidity, and calories of air—I. after passing the nasal chambers, II. after normal nasal inspiration and expiration, III. after oral inspiration and expiration, and IV. after nasal inspiration and oral expiration. The last exhibits the greatest

increase of temperature and humidity of expired air. Oral inspiration and oral expiration shows the inferiority of air, while air inspired by nose and expired by mouth, is but slightly inferior in temperature and humidity if temperature is warm, but shows a marked difference if cold. The relative humidity of air after passing the nasal chambers is near the saturation point with reference to its own temperature, but at its final temperature it falls short of it, viz., the nose saturates the inspiratory stream and contributes two-thirds of the total amount of moisture evaporated by the respiratory tract. II. The physiological alterations in intranasal air pressure during respiration. GOODALE measures the pressure with water manometers and finds the proportion of inspiration to expiration 3:2. Since the pathological variations in intranasal air pressure cannot be even approximately determined with the available material, Goodale imitates the phenomena by constructing an apparatus in which the pressure may be regulated, and the effects of anterior and posterior unilateral and bilateral stenosis can be registered. Anterior reduction of pressure of one side results in a gain to the free side, and behind the stenosis the pressure increases. Bilateral anterior obstruction produces increase in the pressure behind it. Posterior obstruction decreases pressure in inspiration and expiration; the latter becomes even negative. The associated structural alterations are thus explained by disuse of the nose; the pressure variations influence their development.

III. The route taken by respired air within the nose runs at first against the cartilaginous septum (except in upturned noses in which it is lower) and then against the anterior end of the middle turbinate. It is ascertained by the inspirations of compound stearate of zinc, which settles upon these parts.

The excellent paper received the Boylston Medical Prize of Harvard College. M. TOEPLITZ.

GENERAL SUBJECTS.

400. NOLTENIUS, Dr., Bremen. Second annual report of my private clinic for diseases of the larynx, nose, and ear. *Monats. für Ohrenkrankh.*, No. 10, 1896.

401. GRADENIGO, G. Report of the oto-rhino-laryngological clinic at Turin for the years 1895–96. *Arch. ital. di Otol.*, etc., vol. iv., p. 489.

402. RANDALL, B. ALEXANDER. Some observations on objective and subjective tinnitus, aneurismal, anæmic, and muscular. *Trans. Amer. Otol. Soc.*, vol. vi., part iii., 1896.

403. BOTEY. Treatment of vertigo, tinnitus, and some labyrinthine affections with puncture of the labyrinth and following aspiration. *Ann. des mal. de l'oreille du larynx*, etc., No. 12, 1896.

404. HAMON DU FOUGERAY. Remarks on the action of chloroform in very small doses after ethyl bromide, etc. *Ann. des mal. de l'or.*, etc., No. 10, 1896.

405. STOERK, Professor, Vienna. On cocaine anæsthesia. *Wien. med. Woch.*, No. 44, 1896.

406. PHILLIPS, WENDELL C. Remarks upon the causes and prevention of chronic catarrh of the nose and ear. *Am. Medico-Surg. Bulletin*, Oct. 17, 1896.

407. GELLÉ. Peroxide of hydrogen, its combined action as hemostatic and antiseptic. *Rev. hebdom. des mal. de l'oreille*, Nos. 46, 47, 1896.

408. FRANKENBERGER, Dr. O. Adenoid vegetations in deaf-mutes, with remarks on the etiology of deafmutism. *Monatschrift für Ohrenheilk.*, No. 10, 1896.

400. NOLTENIUS, for some time past, operates on hypertrophic palatine and pharyngeal tonsils only in narcosis. A case of tic convulsif was cured by removal of a piece of the septum, a case of tic douloureux by galvano-caustic treatment of the nose. One of the cases of mastoiditis was primary. In tamponade of the mastoid process Noltenius sews the skin entirely after first widening the meatus by two longitudinal incisions as far as into the concha, leaving a flap between of at least 1 *cm* wide. The stapes was involuntarily removed in two cases of thorough scraping of the middle ear without following symptoms of vertigo. In three cases extradural abscesses of the middle cranial fossa were found during the operation. KILLIAN (Freiburg).

401. GRADENIGO thinks that the figures representing the frequency of the various forms of diseases do not admit of general conclusions, since they differ when taken in ambulatories from those in clinics. Otitic complications *e. g.* were found in 41 per cent. of the clinical patients, and only in 1½ per cent. of the ambulatory patients. Tables are added showing the frequency of various affections, arranged according to age and sex, and important clinical observations with epicritical remarks. GRADENIGO.

402. **Randall** says that "when one studies the singular variations of this latter structure [bulb of the jugular] often intruding upon the cavity of the tympanum, and sometimes dilating up into contact with the acoustic nerve in the internal auditory meatus, the marvel must be that we can ever be oblivious of its bruit in health." A case reported by the writer was that of a man, forty-five years of age, who complained of distressing tinnitus. He was quite deaf in the right, slightly so in the left, with depressed drumheads and negative Rinné. The noise was generally a harsh blowing, varying at times, relieved occasionally by auto-inflation and increased by effort, by stooping or recumbency on the left side. He had suffered much with headache and severe vertigo. The case was diagnosed as one of aneurismal dilatation at the commencement of the carotid canal. Ligation of the common carotic was advised. Randall believes that the objective tinnitus, so-called muscular form, which is often ascribed to the tensor tympani, and which is synchronous with the spasmodic movement of the soft palate, is surely due to the separation of the moist and sticky surfaces of the collapsed Eustachian tube.

GORHAM BACON.

403. **Botey** found from experiments on animals that the aspiration of perilymph is not dangerous, and carefully studied on the cadaver the method of opening the round window. If the point of the needle enters close to the upper margin of the round window upwards and somewhat inwards, an injury of the membranous labyrinth is not possible. Botey performed the operation three times on the living and minutely describes the preparatory steps, detachment of *Mt*, and the puncture. The first case was rather an experiment on a deaf and blind inmate of an infirmary; the others showed labyrinthine symptoms, suggesting an increased secretion or diminished absorption of perilymph. Very little result. The deafness was not at all changed, but vertigo and nausea were less. Botey purposes further communications in detail, and mentioned the matter only to protect his priority.

ZIMMERMANN.

404. In children up to fifteen years doses of 20 grammes at the highest of ethyl bromide generally suffice for an anæsthesia of from 3 to 4 minutes' duration. **Hamon du Fougeray**, however, observed unusual excitation in 3 boys (of seven, nine, and ten years of age) out of 300 cases. It subsided readily by dropping 8 to 10 drops of chloroform on the same compress with resulting good anæsthesia. ZIMMERMANN.

405. **Stoerk** uses cocaine solutions of 20 per cent. for anæsthesia of the larynx, 5 per cent. for the nose. In one case of hypertrophy of the inferior turbinated body a 5 per cent. solution of cocaine, brushed in small quantity on the mucous membrane, produced violent symptoms of intoxication, viz., epileptiform convulsions. **Pollak.**

406. **Phillips** advises that at the very outset of an attack of any one of the exanthemata, the nose and naso-pharynx should be frequently and thoroughly cleansed. A spray with warm antiseptic saline solutions, alternating with a free use of medicated oily sprays containing, if necessary, suitable germicides, will usually be sufficient. Climate undoubtedly plays an important part in the causation as well as the presence of adenoid growths, enlarged tonsils, and disease of the nasal passages. The writer does not ordinarily advise operations upon the nose in the case of children, relying mostly on the persistent use of cleansing and astringent solutions. **Gorham Bacon.**

407. An enthusiastic recommendation of peroxide of hydrogen on account of its styptic (?) and antiseptic actions, with detailed remarks on its indication and mode of application.

Zimmermann.

408. Fifty-nine per cent. of 158 deaf-mutes had hypertrophy of the pharyngeal tonsil (leaving out cases of moderate swelling). Forty-two cases showed purulent otitis media or its residuals. Thirty-seven of them had adenoid vegetations. According to **Frankenberger**, these vegetations rather promote affections of the hearing organs during infectious diseases, as their fissures furnish a good soil for pathogenic micro-organisms, and, as lymphatic apparatus, "are apt to convey morbid agents into the deeper portions of the temporal bone." In 64 cases of the author, deafmutism was acquired, not congenital. The postmortem examinations of deaf-mutes so far published generally showed inflammations of the middle ear or its residuals, with changes of the labyrinth. The middle ear alone was diseased only in a few cases. The labyrinth affections of deaf-mutes are much more frequently due to inflammations than to malformations, and mostly acquired after birth even in many cases which were considered congenital. **Killian.**

INSTRUMENTS AND METHODS OF EXAMINATION.

409. **Jankau**, Munich. The double massage, a new method of treatment of some ear diseases; an otiatric instrument case. *Deutsch. med. Wochenschr.*, No. 46, 1896.

410. **Daae, Hans**, Christiania. An apparatus for syringing the nose. *Arch. f. Laryngol.*, iv., 1.

411. **Dionisio, J.** On the employment of acetylene-light in medicine. *Gazetta med. di Torino*, No. 14, 1896.

412. **Blake, Clarence J.** The use of the drill in mastoid operations. *Trans. Amer. Otol. Soc.*, vol. vi., part iii., 1896.

413. **Ingals, E. Fletcher.** Portable compressed air apparatus and nasal saw. *Jour. Amer. Med. Assoc.*, Oct. 3, 1896.

409. **Jankau** devised a case of otiatric instruments (made by Stiefenhofer, Munich, for $5), chiefly for the use of the general practitioner, in which he thinks the latter will find every instrument he may need in aural practice. NOLTENIUS.

410. In the University Policlinic of Christiania, frequently cases of otitis media due to the employment of nasal douches were observed, although correctly used. To avoid this, **Daae** now uses as nozzle a Nélaton catheter, without an eye, but perforated as far as 8 *cm* from the point. After that only one aural affection occurred in about 5,000 irrigations. ZARNIKO.

411. **Dionisio** describes the application of acetylene-light placed on a concave mirror with head-band. The flame is enclosed in a double mantle of aluminium. GRADENIGO.

412. **Blake** exhibited a drill which he had used continuously for the past fifteen years, consisting of a long, broad-bladed instrument, cutting at an obtuse angle, rotated with one hand and held firmly with the other at a point so near the blade that a very slight deviation of the operative end is represented by a wide and easily appreciable movement of the handle. 'This instrument is used to make the preliminary opening in the cortex, to be subsequently enlarged by the chisel, and for penetration through a sclerosed mastoid process to the antrum or its contiguous pneumatic cells. GORHAM BACON.

413. The apparatus consists of a cylinder 8 inches in length and 3½ inches in diameter, the head of which, containing spray tube, bicycle pump, etc., is drawn out and fastened.

The nasal saw, with adjustable handle for different angles, is provided with forward and backward cutting blades, and is made entirely of metal. M. TOEPLITZ.

EXTERNAL EAR.

414. **Webster, Geo A.** Othæmatoma, with report of a case *Boston Med. and Surg. Journal*, Oct. 8, 1896.

415. MORSELLI, E. The oldest description of hæmatoma. *Bollet. delle mal. dell' orecchio*, etc., p. 61, 1896.

416. MAX, EMMANUEL, Vienna. Contribution to the casuistics of defects of the auricle. *Wien. med. Wochenschr.*, No. 46 1896.

417. SCHEPPEGRELL, WILLIAM. Keloid tumors of the external ear. *N. Y. Med. Journal*, Oct. 17, 1896.

418. SOMERS, LEWIS S. Aural herpes. *American Medico-Surg. Bulletin*, Oct. 31, 1896.

419. COLLES, C. J. Rupture of the drumhead of the ear from violent aërial concussion ; with a report of two cases. *American Medico-Surg. Bulletin*, Dec. 5, 1896,

420. OSTMANN, Prof., Marburg. Injury of the right ear by stabbing. *Deutsche med. Woch.*, No. 46, 1896.

421. BRAISLIN, WILLIAM C. A case of living maggots in the ear without previous suppuration. These ARCHIVES, German edition, xxix., p. 370.

422. HARTMANN, ARTHUR, Berlin. On hyperostosis of the external meatus. These ARCHIVES, German edition, xxx., p. 48.

423. VAN ARSDALE, W. W. Plastic operations on the ear. (Section on Surgery, New York Academy of Medicine.) *Amer. Medico-Surg. Bulletin*, Dec. 5, 1896.

424. ANDERSON, WM. Cases illustrating the technique of the plastic surgery of the face. *Lancet*, Oct. 31, 1896.

425. FINNEY, LAWRENCE. Rhinoplastic surgery after lupus. *Brit. Med. Jour.*, Dec. 5, 1896.

414. The case reported was that of a man forty years of age, who had a swelling on the left auricle, the size of a hazel-nut on the upper anterior surface of the auricle, involving the helix, the fossa of the helix, and the antihelix. The cause of the tumor was unknown. When incised, some sanguinolent fluid escaped. A further incision was then carried along the line of the fossa of the helix anteriorly, evacuating the fluid. The cartilage was found smooth and yellow. An incision was then made through the cartilage and skin to the posterior surface of the auricle. The anterior incision was saturated and healed by first intention. The posterior one was packed with gauze and dressed daily for about a week when it healed. The auricle at that time was slightly thickened, but this disappeared later.

GORHAM BACON.

417. Keloid, according to SCHEPPEGRELL, occurs more frequently in the negro than in the white race, and is not due so much to the size or nature of the rings worn in the ear, as stated by some authorities, but to the inherent tendency of this race to the formation of fibroid tumors. He further says that the tendency to recur is very great. Of 14 cases which he has seen, 2 were white patients, 10 negroes, and only 2 mulattoes. His practice has been to carefully dissect out the tumor, after anæsthetizing the part by injecting 5 to 10 minims of a 4-per-cent. solution of cocaine hydrochlorate, and close the wound entirely, if necessary, by a plastic operation, and allow the wound to heal by first intention. In 10 cases of operation by this method, recurrence took place in only 1. The writer gives the notes of 2 of his cases operated upon. GORHAM BACON.

418. Under the heading of aural herpes, the writer reports a case of a male, sixteen years of age, who, when first seen, complained of an eruption at the orifice of the external auditory canal. One week previously he had an attack of acute coryza, with fever and earache (right side). The neuralgic pain continued for a few days, when an eruption made its appearance on the ear. At that time there were from 12 to 14 small vesicles lying almost wholly within the external meatus. The patients' physical condition was below normal, as he was somewhat nervous and suffered from intestinal atony. Under the use of laxatives and a local application of the yellow oxide of mercury, the subjective symptoms quickly disappeared and the vesicular eruption faded away. GORHAM BACON.

419. As the result of the premature explosion of a gun, due to a defective firing-pin which fired the charge before the breechblock was locked in its threads, so that the projectile passed out of the muzzle, while the metal cartridge base was blown backward a long distance, two men on the gun platform were killed and four others were hurled to the ground. One of these was blinded by the blast, while another man and the officer in charge sustained aural injuries as follows :

CASE 1.—Lieutenant ——, U. S. Army, gave a history of no previous ear trouble. After the explosion he could not hear for some time. There was no pain, but considerable tinnitus. Right canal filled with blood. Ordinary voice heard at a distance of three feet. Watch not heard. A large portion of the anterior and inferior segments of the drumhead had been destroyed. Left drumhead slightly congested. The hearing eventually became as good as ever, although slight tinnitus remained.

CASE 2.—Private ——, U. S. Army. No previous ear trouble. After the explosion he had severe nose-bleed, and felt a tremendous hammering tinnitus in his ears. The ears have been discharging for some weeks. The patient was not seen by the writer until six months after the accident. The left ear was discharging at this time, while the discharge from the right had ceased. Right drumhead showed a small perforation in the upper posterior segment. In the left drumhead there was a large loss of substance in the lower half. Bone-conduction better than aërial conduction. Watch heard at three inches, and ordinary voice understood at about ten feet with both ears. The perforation in the right ear closed and the hearing for the watch increased to ten inches. The perforation in the left ear became smaller and the hearing distance was further improved. GORHAM BACON.

420. The remarkable feature of this case is, that the point of a knife, apparently after a stab, was wedged in the posterior wall of the meatus for twelve years before causing any reaction. The foreign body was removed by operation with recovery from the ear affection. NOLTENIUS.

423. The case was that of an infant, six months of age, who had come under observation four weeks previously. There was a congenital deformity of the ear and one side of the face. The ear was much drawn down and back, and the top was turned forward. The anterior border was first freed. By further plastic work the ear was made to present a fair appearance. As a result, the auditory canal was more open, and cerumen was removed from it. GORHAM BACON.

424. In two cases of re-formation of the nose, ANDERSON adjusted the flaps over a support of coiled silver wire fixed to the body walls. CHEATLE.

425. FINNEY supported the flap, taken from the forehead to restore the nose, on a small sheet of celluloid, such as is used in photography, cut into the desired shape, its edges being made to adhere together by touching them with glacial acetic acid and holding them together in a forceps. CHEATLE.

MIDDLE EAR.

426. SHEPPARD, J. E. An analysis of 114 cases of mastoid involvement, complicating acute middle-ear suppuration. *Trans. Amer. Otol. Soc.*, vol. vi., pt. iii., 1895.

427. JACK, FREDERICK L. Acute suppuration of the middle ear, followed by caries of the Fallopian canal and facial paralysis. No involvement of the mastoid cells. *Ibid.*, vol. vi., pt. iii., 1896.

428. FRIDENBERG, EDWARD. Latent mastoid disease. *Med. News*, Oct. 24, 1896.

429. WALKER, SECKER. A case of extensive necrosis of the temporal bone in a child of three years. *Brit. Med. Journ.*, Oct. 31, 1896.

430. WOLF, OSCAR, Frankfort o. M. Acute otitis media an early symptom of acute rheumatic polyarthritis. *Arch. f. Ohrenheilk.*, Bd. xli., p. 213.

431. GRUNERT. What is to be expected as to the improvement of hearing in anchylosis of the stapes-vestibular joint from the operative removal of the stapes? *Ibid.*, p. 296.

432. SPIRA, R. On a case of latent central otitis of the mastoid process representing the aspect of neuralgia of the fifth nerve. *Ibid.*, p. 123.

433. GURANOWSKI, Dr., Warschau. Casuistics of necrosis of the labyrinth. Exfoliation of the osseous semicircular canals, and the posterior portion of the vestibulum. *Monatsschr. f. Ohrenheilk.*, No. 12, 1896.

434. KIPP, CHARLES J. A case of purulent inflammation of the middle ear, with perforation of mastoid cells, followed by erysipelas (with temperature chart). Recovery. *Trans. Amer. Otol. Soc.*, vol. vi., pt. iii., 1896.

435. TOEPLITZ, MAX. The radical cure of chronic suppurations of the middle ear. *The Post-Graduate*, Nov. 1, 1896.

436. BROCA, A. The intracranial complications of otitis media. *Ann. des mal. de l'oreille*, etc., Nov., 1896.

437. LUC. A case of the Bezold variety of mastoiditis ending fatally; symptoms of cerebral abscess. *Arch. internat. de laryng.*, etc., vol. ix., No. 5.

438. MACEWEN, WILLIAM. Surgery of the brain. *Occidental Med. Times*, Nov., 1896.

439. BACON, GORHAM. A case of brain abscess secondary to chronic suppurative otitis media, and presenting unusual symptoms. Operation. Recovery. *Trans. Amer. Otol. Soc.*, vol. vi., pt. iii., 1896.

440. Myles, Robert C. A case of otitic brain abscess in a child seven years old. Cure. *Ibid.*, vol. vi., pt. iii., 1896.

441. Acland, T. D., and Ballance, C. A. Cerebellar abscess secondary to ear disease. *St. Thomas's Hospital Reports*, 1894.

442. Walker, Secker. Cerebellar abscess complicating mastoid disease. *Brit. Med. Journ.*, Nov. 21, 1896.

443. Pooley, Thomas R. A case of otitis media purulenta chronica, mastoid periostitis, mastoiditis interna, abscess of cerebrum, thrombosis of lateral sinus, meningitis, optic neuritis. Death. *Trans. Amer. Otol. Soc.*, vol. vi., pt. iii., 1896.

444. Ridley, Walter. Middle-ear pyæmia. Recovery. *Lancet*, Nov. 28, 1896.

445. Stewart, W. R. H. A case of pyæmia following chronic middle-ear suppuration. Trephining. Recovery. *Ibid.*, Nov. 7, 1896.

446. Adams, John L. A case of thrombosis of the lateral sinus, with recovery after operation. *Trans. Amer. Otol. Soc.*, vol. vi., pt. iii., 1896.

447. Dench, E. B. Thrombosis of the lateral sinus following suppurative otitis media. Operation. Cure. *Ibid.*, vol. vi., pt. iii., 1896.

448. Dench, E. B. Otitic meningitis. Operation. Cure. *Ibid.*, vol. vi., pt. iii., 1896.

449. Knapp, Herman. A case of acute purulent otitis media in which marked symptoms of meningitis developed. The opening of the mastoid and cranial cavities was followed by prompt improvement and subsequent recovery. *Ibid.*, vol. vi., pt. iii., 1896.

450. Riehl, Dr. Carl, Vienna. Contribution to the casuistics of otogenous meningitis. *Wien. klin. Rundschau*, No. 47, 1896.

451. Lannois et Jaboulay. Hemianopia in otitic cerebral abscess. *Archiv intern. de laryng.*, 1896.

452. Schwartze, H. Otogenous cerebellar abscess. *Archiv. f. Ohrenheilk.*, vol. xli., p. 209.

453. Zaufal, Prof., Prague. A case of septic otitic thrombosis of the sinus healed by operation. *Prag. med. Wochenschr.*, No. 49, 1896.

454. Rimini, E. A case of pyæmia in acute otitis media *Bolletino delle malatti dell' orecchio*, 1896, p. 161.

455. **Stern.** Opening of the mastoid process. Phlebitis of the jugular vein; intracranial symptoms of nervous origin. Recovery. *Rev. hebdom. de laryng. d'otol*, No. 50, 1896.

456. **Jackson, Henry.** The treatment of the throat, nose, and ear in scarlet fever. *Archives of Pediatrics.*

457. **Bishop, S. S.** The treatment of acute suppurative inflammation of the middle ear. *Méd. Mirror*, Sept., 1896.

458. **Hoover, F. Pierce.** Mastoid abscess. History and post-mortem. *The Med. Herald*, Aug., 1896.

426. **Sheppard** draws the following conclusions from the report of his cases: 1. For opening the mastoid the gouge and chisel were used excepting only those cases in which the cortex was so much softened as to make the sharp curette more applicable. 2. For cleaning out the mastoid, sharp curettes were used for the outer, blunt curettes for the deeper, portions. 3. Grippe, outside of the acute affections of the nose and naso-pharynx, due to cold, etc., played the most important rôle in the etiology. 4. The symptoms are important in about the following order: (*a*) pain, in the mastoid or in some part of the affected half of the head; (*b*) tenderness, either of the whole, or of some part, of the mastoid (oftenest of the apex); (*c*) drooping or bulging of the posterior-superior canal wall, especially if close to the membrane; (*d*) posterior–superior perforation of the membrane, especially if pouting or teat-like; (*e*) pulsating tinnitus, when it continues as a marked symptom after the time it should have ceased were the case a simple middle-ear inflammation; (*f*) the external symptoms, redness and œdema of the mastoid, and pushing outward of the auricle. 5. Abortive measures should be employed in a majority of cases for from two to five days, and will, as my cases show, be successful in curing a fair proportion of all cases. Having failed after the judicious use of abortive treatment, to give relief, then I believe the following may be justly given as the remainder of my conclusions: 6. We must time and again operate on the strength of one or two symptoms, and often with even these only slightly marked. 7. If a patient is seen before the external manifestations of mastoiditis have developed, we should never wait for their appearance, because by so doing we give the pus the same opportunity for breaking through the internal, as through the external, mastoid cortex, and while waiting we leave the patient in just so much danger. 8. The operation, if performed with due care, is relatively free from danger. Danger to the patient arises, not from

the operation, but from delay in performing it. Finally (9), my cases make me believe that a pretty safe general rule would be, *when in doubt, operate.* GORHAM BACON.

427. The case reported by JACK was that of a man, forty-five years of age, who had suffered from pain in the right ear for six weeks. A discharge at first gave temporary relief. The pain returned and at the end of the fifth week complete facial paralysis of the right side of the face developed. The drumhead was perforated and there was some tenderness on pressure just over the antrum and at the tip of the mastoid. The mastoid cells were opened on the following day and found perfectly normal. The opening was extended into the Fallopian canal and softened bone and pus were found, a fine probe passing anteriorly towards the ear and posteriorly behind the inner table of the mastoid. The opening was carefully enlarged in both directions and curetted. "The function of the facial nerve was evidently destroyed." The pain ceased after the operation and the wound healed.

GORHAM BACON.

428. Under this heading, of latent mastoid disease, FRIDENBERG, reports four cases in which it was necessary to open the mastoid cells, and says "that these cases are merely types in which disease of the mastoid, acute or chronic, produces a great destruction within the bone, symptoms not arising until the pathological process approaches or reaches the meninges or the semicircular canals on the one hand or the periosteum on the other—and the lesson which they teach is, that in any case in which purulent discharge from the middle ear continues or extensive carious destruction of the contents and walls of the tympanic cavity exists or has existed at any time, latent mastoid disease should be considered as a possibilty and guarded against. GORHAM BACON.

429. Following scarlet fever, WALKER removed a sequestrum consisting of the cochlea, semicircular canals, the internal auditory meatus, and parts of the mastoid cells; a large cavity was left, the posterior and upper walls of which were formed by the dura mater of the middle and posterior fossæ. CHEATLE.

430. 1. A merchant, aged fifty, after acute sero-purulent otitis media, fell ill with severe articular rheumatism with endocarditis ending fatally after 1½ years. 2. A gardener, aged 18 years, four days after commencement of a slight angina was seized with acute catarrhal otitis media (right) and. after another week, with pericarditis and pleurisy of longer duration. In both cases the re-

maining membrane of the tympanic cavity after subsidence of the rheumatism remained thickened (as inferred from the condition of the *Mt*). WOLF considers this as the beginning of sclerosis of rheumatic origin. He thinks that the morbid agent of rheumatism was conveyed to the ear by the blood current, or perhaps *per tubam*, where it becomes primarily localized. BLOCH.

431. GRUNERT's answer is: Nothing, in affections of the labyrinth, nor in many other affections, *e.g.*, of the round window. The effect on tinnitus is also doubtful. The experiments will be continued however. BLOCH.

432. There probably was a subdural abscess after acute otitis media. BLOCH.

433. In a child aged 2½ years, an otorrhœa after scarlet fever had developed, when it was nine months old. From the outset it was complicated with inflammation of the mastoid process. An extensive caries of the petrous bone was followed by sequestration of the osseous semicircular canals and the posterior portion of the vestibulum. The sequester was removed by operation.

KILLIAN.

434. The patient of KIPP, a married woman, thirty-seven years of age was first seen in January, 1895. At that time there was purulent inflammation of both middle ears with perforation of the drumhead. She neglected treatment for some time but came back to the Infirmary on March 22d when, in addition to the middle-ear disease, there was a large swelling below the right mastoid process extending down the side of the neck. Skin not red and there was indistinct sense of fluctuation. On making an incision there was found a perforation in the medial side of the mastoid into the digastric fossa and the pus had burrowed down the neck under the deep cervical fascia. In the mastoid process there were found pus and granulations. At the time of the operation, the integument of the auricle was red and had the appearance of erysipelas. On the following day, the temperature suddenly rose to 104.8° F. The erysipelas travelled across the face to the other auricle. The temperature remained high till the seventh day. The erysipelas did not invade the wound. The patient was discharged from the hospital on April 24th. The otorrhœa at that time was still present and she was treated as an out-patient.

GORHAM BACON.

435. TOEPLITZ believes that, in cases of chronic suppuration confined to the attic in which the malleus and incus only are

carious without implication of the bony walls, removal of the ossicles alone will effect a radical cure. A series of operations performed by him, he says, confirms this view. When, however, the caries has implicated the bony walls, principally the posterior or the inner labyrinth wall, which condition may be diagnosticated with the probe ; when the discharge remains very offensive, when the pain in the ear and the corresponding side of the head become so persistent as to make the patient's life miserable, then, after all other measures of relief have been exhausted, the radical removal of all diseased portions becomes imperative. The writer recommends Stacke's operation for these cases, and reports that since Feb., 1895, he has operated upon five cases according to this method, two of which are entirely cured. The remaining three cases are still under his care, in two of which he has had to remove the greater portion of the petrous bone piecemeal after persistent treatment with pure acids. He believes they will soon recover. GORHAM BACON.

436. BROCA corroborates his former opinion by examples. Only in meningitis are operations without avail. Sometimes, however, an operation will be made, since the symptoms are never entirely beyond doubt, and other intracranial complications can never be totally excluded. Broca gives in detail two new cases of his own observation in children (besides those published by him). The first principle must be, if an intracranial complication is suspected, free opening of the tympanic cavity and mastoid process, and hence going deeper without making a second opening. This is particularly essential for the extradural abscess. Broca does not advocate indiscriminate opening of the cranial cavity in healthy bones, but thinks it sufficient to give free access to the antrum in acute cases, in chronic to the antrum and the tympanic cavity, even if indistinct cerebral symptóms should present themselves. If carious bone is found an extradural abscess may be expected. The opening of the extradural abscess is sufficient, which, especially in children, often produces serious symptoms. In sinus thrombosis Broca prefers previous ligation of the jugular vein, with a better prognosis if the case is operated on earlier. The starting-point for the operation is also the antrum. This ought to be the rule in cerebral and cerebellar abscesses, although the access to them may be more narrow and more dangerous. Broca supports his opinion by detailed clinical histories.

ZIMMERMANN.

437. At the operation the whole mastoid process was found to be resolved into a cavity, which was thoroughly scraped. Upon pressure on the infiltration below the mastoid process, pus oozed from a hole in the posterior osseous wall of the cavity. A bent probe was carried from this hole down towards the neck until it was felt through the skin, and the whole bridge of tissue and bone cut on the probe. The large cavity was filled with a tampon. The case was demonstrated before a medical society as one in reconvalescence, but the patient died after scarcely a month from an intracranial complication, probably cerebral abscess. Unfortunately LUC was not permitted (by the family physician) to perform an operation and afterwards an autopsy.

ZIMMERMAN.

438. MACEWEN, by invitation of the Cooper Medical College, delivered five lectures on the Surgery of the Brain, thus inaugurating the "Lane Course of Lectures."

Lecture one was devoted to a consideration of the anatomy of the brain, in which the lecturer says that "the true form of the brain in relation to its envelopes is best seen in frozen sections. The projection of the cerebellum beyond the foramen magnum, as seen in frozen sections, not only affords the vital centres an amount of protection, but serves to explain the apparent discrepancy in clinical observations of symptoms arising from tumors situated in one or other of the lateral lobes." The writer referred to a case where the patient had had a fall about a week previously, but had not lain down since the injury, as he had a sense of impending death upon assuming the recumbent position. Upon admission to the hospital, he was persuaded to go to bed, and within a short time death followed. This was explained at the autopsy by the pressure of a blood clot on the respiratory centre.

In the *second lecture*, Macewen spoke of localization of the brain, and exhibited a number of frozen pathological sections of the brain, and showed a drawing of one of the earliest tumors of the brain upon which he had operated.

Lecture three was devoted to a consideration of the mode of detection of cerebral and cerebellar tumors and their treatment. He advises that the first point that is essential in looking at any possible case of brain disease is to eliminate all of other sources or symptoms of disease.

Abscess of the brain was the subject of *lectures four and five.* Macewen is of the opinion that abscesses of the brain occur very frequently, and that often they are not recognized, and that the most frequent way in which they occur is by the pyogenic erosive processes produced in the skull and in the soft tissues which line it, and which therefore by extension penetrate into the brain. He says: "When you have a cerebellar abscess caused by a focus in the middle ear, we find that that abscess is in immediate contiguity with the sinus (lateral); we do not find it occurring in other parts. If, therefore, after opening the middle ear, we find that the erosive process has taken a backward direction, and that it comes in contact with this sinus, and if the symptoms of an abscess have already been noted, then be assured that you can get at that abscess by going around this large blood channel to its posterior surface"; and further, "in every case of cerebellar abscess which I have had, arising from middle-ear disease, this has been the course that it has taken."

The symptoms of abscess are a distinct lowering of the pulse rate and a marked reduction of the temperature. In the early stage, every case will complain of severe pain in the head. The pain in a few days may be less, but at that time there will be noticed a marked slowness in cerebration. Macewen believes that the first thing that should be done in operating is to open the mastoid antrum, and once inside that cavity we have a very good guide for further operations. After the antrum has been opened, a careful examination should be made as to the position of the erosions and the direction of the same. The lecturer uses, for the purpose of removing the outer portions of the bone, a gouge with a large and flattened head which can be held in the palm of the hand. In addition he recommends burrs (made by the S. S. White Company) which are rotated by a surgical engine. He advises against the use of a drainage tube for an abscess cavity. If desirable to irrigate the brain two canulas should be introduced so that the fluid injected through the upper one can escape through the inferior and larger exit. GORHAM BACON.

439. The case was that of a young man, thirty-two years of age, who had a chronic otorrhœa (left side) of fifteen years' duration as a result of measles. He had complained of some pain in his head and had acted strangely for some little time. On December 5, 1895, he was confined to his room with a temperature of 104° F. He also had an intense headache and earache. He had a convulsion the same day and was unconscious for half an hour afterwards. The auditory canal was filled with granulations and foul-smelling pus.

The patient was etherized, the mastoid cells opened and communication established between the antrum and mastoid opening. The external meatus was thoroughly curetted. The lateral sinus was injured during the operation as it ran out of its usual course and a copious flow of blood followed, but this was controlled by packing. The patient was much relieved by the operation and remained so for two days when, on December 8th, he developed aphasia. On the following day he had a severe chill followed by profuse perspiration and severe headache. Temperature, 104.8° F. Fundus of each eye normal. December 10th.—Patient again etherized and the sinus explored but no clot was found. A button of bone was removed, the centre pin of the trephine being placed at a point two inches above the centre of the external meatus. The dura was found bulging but pulsating. The opening in the bone was considerably enlarged with rongeur forceps. The dura was found thickened over the tympanic roof, and on separating it from the bone, a gush of foul-smelling pus came away. A Y-shaped incision was made in the dura and a large abscess cavity was found in the temporo-sphenoidal lobe, from which an ounce and a half of pus and broken down brain tissue escaped. The abscess cavity was not syringed out but loosely packed with iodoform gauze. There was some fluctuation in the temperature till December 15th, when it became normal. The abscess cavity gradually filled up and the patient made a slow but uninterrupted recovery. The case was reported especially to demonstrate the point that a patient with a cerebral abscess may have chills, high temperature, rapid pulse, and convulsions so that a differential diagnosis between abscess of the brain and lateral sinus thrombosis becomes difficult. GORHAM BACON.

440. The case of MYLES was that of a little girl, seven years of age, who had had scarlet fever and measles three years previously. About that time the right ear began to discharge and continued to do so at intervals ever since. When first seen, the patient was comatose and could not be aroused. The right auricle protruded, there was extensive swelling over the mastoid region, and a purulent discharge from the ear. The mastoid process was opened and the outer wall wholly removed. The bone was found soft and necrotic and filled with granulation tissue and pus. The curette was passed upward into the attic, and, when curetting away some granulations, suddenly slipped into the cranial cavity. A portion of the roof of the attic was removed and a wine-glassful of

pus escaped. About three weeks after the operation a large swelling appeared under the posterior border of the mastoid process and the occipital bone. A large burrowing abscess was found and a counter-opening was made. The patient removed from the city and was not seen by Myles for nearly two years, when she returned, and at that time her physical condition was excellent, appearance robust, and color good. There was still some disdischarge from the ear. For a year after the operation she was stupid and mentally weak at times, but for the past six or eight months she was bright and active. GORHAM BACON.

441. A boy, aged 15 years, had measles at the age of six years followed by a right otorrhœa which had continued ever since. Frontal headache and staggering five days before admission. Vertigo, vomiting, nystagmus, and severe occipital headache for four days. A thin pale boy, drowsy; curled up on his left side with general flexion of both limbs; both eyes deviated to the left; nystagmus, pupils normal, signs of early papillitis; no facial paralysis; right arm and both legs evidently weak; right knee-jerk increased. Fœtid pus from right ear. No abnormal signs over mastoid. Temperature subnormal, pulse about 56°. The mastoid process and tympanic antrum thoroughly cleared of pus and granulation tissue. Posterior meatal wall removed. Half an ounce of pus evacuated from right cerebral lobe. Great improvement resulting from the operation. Nine days later symptoms suddenly returned, with some reddish thin discharge on the dressing. A week still later, a collection of blood evacuated from near site of abscess. Recovery.

Besides the case, ACLAND and BALLANCE give an exhaustive account of the subject which should be carefully studied. Special attention is drawn to the paresis of the limbs and increase of the knee-jerk. CHEATLE.

442. At a meeting of the Leeds and West Riding Medico-Chirurgical Society, Mr. WALKER read notes of the case of a boy, aged fourteen years, who had recovered after evacuation of an abscess in the left cerebellar lobe.

Among the symptoms were, occasional shivering and vomiting with constipation, weakness of arm muscles on both sides, increased knee-jerk on the left side. There was no optic neuritis, or paralysis of the ocular or facial muscles. In syringing out the abscess cavity, Macewen's plan was followed of introducing two different-sized tubes and syringing gently down the smaller one.

CHEATLE.

443. Pooley reports the case of a lad, twelve years of age, who had suffered for many years from otorrhœa of the left side. When admitted to the hospital, there were all the characteristic symptoms of mastoid disease. Temperature 102½° F., pulse 128. A Wilde's incision was made, which afforded temporary relief for a few days. Six days later, the mastoid cells were opened and foul-smelling pus and carious bone were removed. Lateral sinus exposed during the operation. On the day following, the patient had a severe chill, with a temperature of 104⅘° F. On July 29th, choked disc on the left side was discovered. An attempt had been made to keep the temperature down by medication and the application of ice. The patient gradually became worse, becoming blind in the right eye on August 20th. There was found on August 22d violent choked disc, with hemorrhages in the left eye. August 23d, motor paralysis of the right side developed.

Patient became comatose and died September 3d.

Autopsy.—Vessels of dura mater intensely engorged and lifted up by purulent collection. On opening the dura, a layer of foul-smelling pus covered the entire left hemisphere. Pia intensely engorged ; entire base of frontal lobes bathed in pus. Optic nerves swollen and sheaths distended. A large, capsulated abscess was found in anterior portion of occipital lobe of the left side. Extensive thrombosis of lateral sinus extending to torcular Herophili, with caries of the temporal bone.

Gorham Bacon.

444. At the Northumberland and Durham Medical Society, Mr. Ridley showed a young man whose internal jugular vein had been ligatured and skull opened, for high fever and recurrent rigors, during the course of a fœtid middle-ear suppuration. The vein was filled with fœtid clot, as far down in the neck as it was possible to follow it. A subdural abscess was opened, and the sinus, which was found to be only blocked in its mastoid portion, cleared out. Recovery occurred. Cheatle.

445. Stewart's case was that of a boy, aged eleven years, who, for five days before admission to the hospital, had suffered with pain in the right ear, with vomiting and shivering. On admission, temperature 97°, swelling and tenderness behind the ear, and slight swelling of the right optic disc. The antrum was opened, with temporary improvement. Lateral sinus explored and found to contain a healthy clot. Dura mater incised, letting out a large amount of serous fluid. As the rigors still continued

the lateral sinus was slit up, and the clot, which was perfectly sweet, removed. Recovery resulted. CHEATLE.

446. ADAMS reports a case of a young woman, seen March 9, 1896, twenty-four years of age, who five years previously had trouble with her left ear following a cold. Otorrhœa followed, which continued for a year, and ever since she has had tinnitus in the same ear and has been dizzy whenever the least pressure was made on the external auditory canal. Six weeks ago she had another cold, followed by pain in the same ear. The ear commenced to discharge and was syringed with a warm boracic-acid solution. The pain was severe, so that a leech and warm fomentations were applied. A fainting spell occurred and chills developed, with a temperature of 104° F., and vomiting. There was great pain in the ear and frontal portion of the head. She came under Adams's care at this time, and was admitted to the hospital. There was intense pain over the left mastoid ; the latter was swollen and very sensitive to pressure, especially at the tip. The swelling extended down the neck, but no cord-like condition of the jugular vein could be discovered. The canal was filled with whitish purulent masses, and the posterior wall was swollen and boggy. The membrana tympani was almost wholly destroyed.

The patient was etherized. A perpendicular linear incision was made, extending from the tip of the mastoid to half an inch above the posterior root of the zygoma. From the upper extremity of this, another incision was carried directly backwards for three-quarters of an inch. The outer bony table of the mastoid was removed. The posterior osseous wall of the external auditory canal, together with the mastoid cells, was found destroyed and the cavity filled with pus and cholesteatomatous material. This was all scraped away with curettes. The sinus was then exposed. Pus was found around it. An exploring needle was introduced in the sinus ; the latter was found to contain no blood. A clot was removed from the upper end of the sinus, and a small curette was passed toward the torcular Herophili. The contents below were removed for as great a distance as the curette could be introduced, but no fluid blood could be obtained from this side. The sinus was irrigated with a salt solution and packed with iodoform gauze. For ten days after the operation, the temperature fluctuated more or less, being considerably elevated at times. Pockets of pus in the scalp were found and opened. After that time, the patient improved rapidly, and on May 1st the wound was healed. GORHAM BACON.

447. The case of DENCH was that of a young man, eighteen years of age, who had suffered five years from a suppurative otitis media. He had no further aural symptoms until the present time when he complained of severe pain in the ear, which gradually spread over the mastoid region. He also complained of nausea and vertigo. The ear began to discharge, and five days later he was admitted to the hospital. At that time there was a scanty sero-purulent discharge. There was bulging of the upper portion of the drumhead. There was considerable tenderness on pressure over the mastoid antrum. Temp. 101° F. The drumhead was freely incised and the ice-coil applied. Twelve hours later the patient had a severe rigor, with temperature reaching 105.8° F. There was also severe headache, delirium, and incontinence of urine and fæces. The temperature fell but rose again.

The patient was etherized and a free incision made over the mastoid process, and upon removing the cortex the pneumatic spaces were found filled with foul cheesy matter. The internal table was destroyed and the meninges exposed. The lateral sinus was explored with a needle and found empty. The sinus was opened and a fibrinous clot removed with the curette. The sinus was further incised and followed downward to within about one quarter inch of the bulb of the jugular vein. By making firm pressure on the int. jugular vein in the neck, and by carrying a small curette downward in the direction of the bulb, blood flowed freely. The sinus was then opened up in the other direction towards the torcular and a curette brought away a fibrinous clot, and free hemorrhage ensued. The wound was dressed with iodoform gauze, which was not removed for five days. During this time the temperature did not rise above 99° F. The patient made an excellent recovery. GORHAM BACON.

448. The history of DENCH's case was as follows : A man, sixty years of age, had suffered twenty years previously from a double suppurative otitis following typhoid fever. Five weeks ago he was seized with severe vertigo and a feeling of fulness in the left side of the head The disturbance in equilibrium abated somewhat after a short time, but was followed by intense pain in the left ear and left side of the head. During an interval of three weeks the temperature remained normal ; it then suddenly began to rise and fluctuated between 102° and 104° F. Under aseptic precautions the cranial cavity was opened, but the mastoid antrum was not entered as a previous otoscopic examination showed no

obstruction to drainage from the external meatus. On opening the skull just above the external auditory canal the meninges were found much congested and there was a free discharge of bloody serum from the epidural space. A probe passed along the tympanic roof showed slight roughness and evacuated still larger quantities of bloody serum. This discharge was very profuse. After this a dural flap was turned down and the cerebral substance explored in several directions by means of a large aspirating needle. No pus was found. The lateral sinus was explored and found normal. After the operation the temperature never rose above 101° F; the headache and dizziness disappeared. The patient left the hospital four weeks later.

GORHAM BACON.

449. The case was that of a healthy woman attacked with follicular tonsilitis and naso-pharyngeal catarrh. Nine days later she had a second attack, more marked than the first, followed by severe pain in the left ear, dizziness, and a temperature of 102°–104° F. Drumhead bulging and burst on the third day. After the discharge there was relief. Three days later the discharge suddenly ceased and there was more pain and projectile vomiting. This was followed by improvement, and she felt well for nine days when the discharge ceased again. Then pain in the head and ear became intense, and there was dizziness, nausea, vomiting, delirium, apathy, drowsiness, and she answered slowly and incoherently. Temperature 104° F; pulse, which formerly had been slow, was now 140. The mastoid was tender on pressure; the external meatus was narrowed by bulging of its posterior wall; the left optic disc was congested.

The mastoid cells were freely opened, as well as the posterior and middle cranial fossæ, and communication was established between the mastoid antrum and tympanic attic. No pus was found, but extensive destructive osteitis (caries). The operation was followed by prompt improvement, leading in six weeks to perfect recovery. KNAPP says that "the most remarkable incident of the case was the sudden appearance of copious, somewhat offensive, slightly greenish discharge from the mastoid wound, which occurred two days after the operation, and with which the morbid process had exhausted itself." He was satisfied that "the destructive osteitis had transmitted material into the cranial cavity, which, without the vent produced by the opening of the parts involved, would probably have proved fatal through the development of general meningitis."

GORHAM BACON.

450. Post-mortem examination of a patient, who died on the third day of his sickness with the symptoms of acute meningitis. Meningitis at the base and convexity, thrombosis of the sigmoid sinus; tympanic cavity, antrum, and mastoid cells filled with a mass like raspberry jelly; *Mt* atrophic, deeply retracted, not perforated. The bacteriological examination suggested acute infection due to influenza. RIEHL considers it as a hæmatogenous affection, from the clinical picture and the pathological changes of the brain and the temporal bones. POLLAK.

451. A patient who had otorrhœa for twenty-five years, suddenly showed all symptoms of cerebral abscess: vertigo, staggering gait, nausea, dysphasia, violent headache, hemiparesis of right side, without rise of temperature. Signs of sensory aphasia and homonymous hemianopia, with preservation of pupillary reaction, pointed to the seat of the abscess. Wernicke's reflex proved the abscess to be in the occipital lobe, not in the temporal lobe.

In spite of the positive diagnosis two attempts to find the abscess failed, until the pus cavity was reached by a third trial, based on the positive diagnosis. The latter was confirmed by the autopsy. HARTMANN.

452. Chronic offensive purulent otitis media, defect of the posterior half of *Mt*, intermittent headache at occipital region, vomiting, constipation, vertigo after closing the eyes, tendency to fall towards the healthy side, right pupil dilated, patellar reflex increased; low, frequent, and often irregular pulse, subnormal temperature. Death through paralysis of respiration. Abscess of the right hemisphere of the cerebellum of the size of a walnut, circumscribed lepto-meningitis and internal pachymeningitis, old endocarditis deformans. New formation of connective tissue in the labyrinth. The symptoms of the abscess were headache, vomiting, and the unequal size of the pupils. The heart disease could not be recognized during life.

BLOCH.

453. Acute purulent otitis media of right ear with perforation of the anterior-inferior quadrant, fever, no chills, hemicrania, slight drowsiness, stiffness of neck, sluggish reaction of the pupils, no changes of the fundus of the eyes, paralysis of the bladder, retardation of pulse, pain in the right mastoid process, which did not show any changes externally. The operation revealed pus in the deep posterior cells of the mastoid process. Chiselling of the sigmoid sulcus lays bare a perisinuous abscess. Apex removed

by chisel, sinus exposed and opened with the scissors, the lateral wall cut away, the jugular vein ligated in the region of the thyroid cartilage. In the further course metastatic abscesses formed between the glutei muscles of left side, and purulent pleurisy; the former were incised, the latter punctured. Complete recovery within six weeks. POLLAK.

454. A child, aged seven years, with acute catarrhal inflammation of left ear. Two paracenteses started very moderate mucous discharge. Chills set in with high fever of pyæmic character, and later on pain in right wrist and left knee-joint. Opening of the mastoid did not show anything pathological, but on exposure of the sinus a moderate quantity of pus escaped. Its walls were discolored, no pulsation. After incision small thrombi adherent to the walls were pulled out. No pus in the sinus itself. Pyæmic symptoms persisted even after the operation; metastases in right wrist and left hip-joint, which were operated on. Icterus with decoloration of fæces two days after trephining. Recovery in three months. The case is rare, since it was one of acute otitis which had a benign character from the start.

GRADENIGO.

455. The sinus was not discolored at the time of the operation, and therefore was not opened. Four days after the operation, the jugular vein became painful and its neighborhood infiltrated. On the tenth day, first chill. On the twelfth, incision of the infiltration below the mastoid process without pus being found. On the fourteenth day, second chill, with increased swelling around the jugular vein. On the twenty-seventh day, the infiltration was cut and much pus liberated. After that spontaneous recovery, which soon was interrupted after nervous excitement by symptoms suggesting an intracranial complication. They subsided, however, entirely within the next three weeks under internal treatment. ZIMMERMANN.

456. JACKSON calls attention to the great importance of carefully examining the nose, throat, and ears during the course of scarlet fever. There are pseudo-membranous lesions of the palate, and this process may spread to the post-pharyngeal wall, and after invasion of the pharyngeal vault, to the nose. This process is usually found on the third or fourth day of the disease and is the direct cause of the most alarming and fatal complications of scarlet fever, namely, septicæmia, otitis media purulenta, and infection of the cervical glands, besides serious

kidney lesions. The writer advises the use of a 4 % boracic acid solution for the mouth and nose, and if the pain is severe Dobell's solution can be used. He recommends the atomizer instead of the nasal douche, and says "it was the experience of the aurist at the City Hospital that when nasal douches were employed as a routine treatment, disease of the ear was much more common than when the nose was not so treated." If the ear becomes affected, he advises that an aurist be called at once, "as an immediate incision of the drum with inflation may in many cases save the patient from weeks of suffering as the result of purulent otitis." GORHAM BACON.

457. After a very extensive use of aristol in acute suppurative inflammation of the middle ear, BISHOP finds that it is a very light and non-irritating powder, with an inoffensive odor, besides possessing an anæsthetic property to a certain degree.

GORHAM BACON.

458. The patient, a man aged forty-seven, had suffered in the head, especially on the left side, so that he would cry out in agony. On examination there was much tenderness over the mastoid on the left side and left side of the head, the swelling being particularly marked at the posterior and superior border of the mastoid portion. There was marked fluctuation over the left parietal bone. An incision was made, under cocaine, and a large amount of pus evacuated. The following day the patient was etherized and the incision previously made was enlarged, and necrosed bone as well as granulations were removed. The wound was dressed with bichloride solution and iodoform. The patient's temperature remained high, reaching 105° F. The patient's condition gradually became worse, until he became comatose. He died ten days after the operation. A *post-mortem* examination showed that the lateral sinus extending back on the left side to the junction of the superior longitudinal sinus contained a purulent thrombus. The latter extended into the superior petrosal sinus, but the inferior petrosal sinus was normal.

GORHAM BACON.

NERVOUS APPARATUS.

459. POLITZER, A., Vienna. Ménière's disease from traumatic lesion of the labyrinth. *Arch. f. Ohrenheilk.*, Bd. xli., p. 165.

460. ALT, FERDINAND, Dr. On deafness after mumps. *Monatschrift f. Ohrenheilk.*, No. 12, 1896.

461. THOMAS, HENRY M. Alveolar sarcoma of the cerebellum. Clinical report. *Bulletin Johns Hopkins University*, Nov., Dec., 1896.

462. ALDERTON, H. A. The influence of deafness upon the development of the child. *The Medical Standard*, Sept., 1896.

463. GOWERS, W. R. Subjective sensations of sound. *Brit. Med. Journal*, Nov. 14, 1896.

459. A man, aged seventy-one years; fracture of skull with paralysis of right facial and auditory nerves, disturbance of equilibrium, acute purulent otitis media. Death after thirty-nine days from purulent meningitis, bronchitis, and lobular pneumonia. The fracture of the right petrous bone runs through the internal auditory meatus and the cochlea. The latter is filled with reddish-yellow granulations. Analogous lesion on left side, but only the lower whorl of the cochlea contains a reddish fluid. Histologically the cochlea contained an exudation partly consisting of round cells; the endosteum showed inflammatory swelling. The same inflammatory products in the vestibulum, ampullæ, and semicircular canals. The new formation of connective tissue is farther advanced on the left side. In the two former cases described by VOLTOLINI and POLITZER the fractures showed the same direction. They seem to be independent of place and direction of the trauma. This rapid proliferation of connective tissue probably leads to speedy and lasting deafness, also in inflammations of the labyrinth from other causes (with consecutive ossification).

BLOCH.

460. After a careful review over the literature, ALT describes the following case: A girl, aged twelve years, grew completely deaf on both sides on the third day of mumps. After pilocarpine, iodine, and hearing exercises, the deafness subsided so far within three months that she could understand ordinary conversation at a moderate distance. KILLIAN.

461. The case reported by THOMAS was that of a young lady, aged thirty, who was seen October 17, 1895. She complained of difficulty in walking, of deafness, and difficulty in seeing. She had always been delicate. Three years ago she had very severe headaches, which recurred almost every day until August, 1895, when she received glasses that gave her some relief. She had at times momentary losses of vision, especially of the left eye, but sometimes of both. For about a year she has had difficulty in walking, at times staggering; also a sensation of tingling in the

feet and of numbness in her nose and mouth. Since January, 1895, she has become more or less deaf. When examined, October, 1895, there was a well-marked rotatory nystagmus, which increased in looking toward the left; fields of vision slightly contracted; vision practically normal. An ophthalmic examination showed well-marked neuro-retinitis of both eyes. She was quite deaf in the left ear, not being able to hear the watch. Hearing fairly good in the right ear. When standing with closed eyes, she staggered, and if not steadied would fall to the left. The presence of a brain tumor was suspected, although the possibility was entertained that the case might be one of multiple sclerosis combined with hysterical symptoms. She remained in about the same condition until October 25th, when she fell in the street, after which she was never able to walk again. The headaches then became severe, and the hearing in the right ear was worse and tinnitus developed. Early in December she was unable to hear any sound, either by bone-conduction or any other way. Vision left her finally. She had two or three attacks of vomiting and slight convulsions, and later there occurred a complete right facial paralysis. After these late symptoms developed, Thomas believed that the growth involved the corpora quadrigemina.

In the same number of the *Bulletin*, L. F. Barker published "Remarks on the Anatomical Relations of the Cochlear and Vestibular Nerves."

The post-mortem examination of the above case was made by Dr. Flexner, and the pathological report was as follows: The dura mater was free from adhesion to the calvarium. Internally the dura adhered to a tumor mass which projected on the left side into the inferior fossa of the skull. The tumor measured 6×4×4 *cm* and was attached to the median side of the left lateral cerebellar hemisphere, its growth being directed forwards. The tumor had exerted pressure laterally upon the left corpora quadrigemina, the right being but little, if at all, involved in the compression. The tumor had also flattened the left half of the pons almost to the median line. The left crus cerebri was pressed upon, particularly on its superior surface, and the left superior peduncle of the cerebellum partially flattened. The middle and right lobes of the cerebellum were free from the tumor and effects of direct pressure. The growth extended beneath the dura where it covered the petrous portion of the temporal bone. The seventh and eighth nerves on the left side were pressed upon and much flattened, those of the right side appeared small and atrophied. All the ventricles of the brain were dilated, and contained an excess of clear fluid. From a microscopical examination the diagnosis of alveolar sarcoma was made, and it was believed that the tumor sprang from the cerebellum. GORHAM BACON.

462. ALDERTON claims that it should be the duty of the local board of education to form a special class in the public schools for the instruction of those handicapped (deaf) children, by teachers trained especially for this purpose. The child with impaired faculties is as much entitled to public instruction as the healthy child; the fact that unusual methods and special teachers are required should be no rightful bar to its claim.

GORHAM BACON.

463. The Bradshaw Lecture delivered by GOWERS before the Royal College of Physicians is a philosophical dissertation, which, although not adding considerably to the knowledge of this difficult subject, furnishes abundant food for thought, and indicates, in a truly scientific manner, the way in which the subject should be considered. Many most interesting cases are related.

CHEATLE.

NOSE AND NASO-PHARYNX.

464. PLUDER, Dr., Hamburg. On rhinitis fibrinosa diphtherica. *Deutsche med. Wochenschrift*, Nos. 44 and 46, 1896.

465. PRICE-BROWN, J. Clergyman's sore throat. *Amer. Medico-Surg. Bullet.*, Oct. 3, 1896.

466. SEISS, RALPH W. Treatment of atrophic rhinitis. *Med. News*, Nov. 28, 1896.

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469. LANTIN, G. On foreign bodies in the upper air passages and four new cases of rhinoliths. (From the Vienna General Polyclinic, department of Prof. Chiari.) *Arch. f. Laryng.*, iv., p. 2.

470. ROCHARD and GOUGUENHEIM. Enormous sequester of the left nasal cavity in syphilis. *Ann. des mal. de l'or. du lar.*, No. 10, 1896.

471. SMITH, J. W. Foreign bodies in various regions. *The Medical Chronicle*, Sept., 1896.

472. MACCOY, ALEX. W. Irruption of teeth into the nasal chambers. *N. Y. Med. Jour.*, Dec 26, 1896.

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475. ARSLAN, Y. Abscess of the nasal septum. *Bollet. delle mal. dell'orecchio*, etc., p. 70, 1896.

476. BERGEAT, HUGO, Dr. The etiology of deviations and spinæ of the nasal septum. *Monatschr. f. Ohrenheilk.*, No. 11, 1896.

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480. RUPP, ADOLPH. Nasal polypus in a female infant four weeks old. *Med. Rec.*, Nov. 14. 1896.

481. BOND, J. W. Case of sarcoma of nose after operation on June 12, 1896. *Proc. of the Laryng. Soc. of London*, Nov. 11, 1896.

482. RIPAULT. Treatment of empyema of the supramaxillary antrum by making a large opening. *Ann. des mal. de l'or. du lar.*, No. 14, 1896.

483. MARGARUCCI, O. Contribution to the surgery of the frontal sinus. *Archiv. ital. di otologia*, etc., iv., p. 457.

484. TREITEL, Dr., Berlin. On cerebral abscess complicating empyema of the frontal sinus. *Deutsche med. Wochenschr.*, 1896, No. 47.

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486. BABER, CRESSWELL. Mucocele of the frontal sinus; radical operation; recovery. *Proc. of Laryng. Soc. of London*, Nov. 11, 1896.

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489. MASLACK, ELLWOOD. Two interesting nasal cases. *N. Y. Med. Jour.*, Oct. 10, 1896.

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491. DELAVAN, D. BRYSON. The ultimate prognosis in neglected adenoid hypertrophies. *N. Y. Polyclinic*, Dec., 1896.

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510. NEWMAN, DAVID. Epithelioma of the tonsil and left posterior pillar removed by lateral pharyngotomy. *Lancet*, Nov. 28, 1896.

464. PLUDER observed six cases of rhinitis fibrinosa diphtherica, of which five were examined in the bacteriological institute of Hamburg. Loeffler's diphtheria bacilli were found in all. Pluder observed "combination with pharyngeal diphtheria in the same patient, as well as severe and slight diphtheria of the pharynx and diphtheritic angina in persons in contact with the patient," the nasal affection sometimes preceding, sometimes following. Pluder therefore thinks that there is no antagonism between fibrinous rhinitis and diphtheria, and that fibrinous rhinitis is not always to be taken for a harmless affection. There is only one objection to the identification of both diseases, viz., that so far no case of rhinitis fibrinosa has been observed which was followed by a paralysis. NOLTENIUS.

465. The designation of clergyman's sore throat is obsolete. The large majority of chronic throat disease originate in nasal or naso-pharyngeal obstruction. Follicular pharyngitis, catarrhal and follicular tonsillitis with enlarged and hardened tonsils and hyperæmia of vocal cords constitute the real clergyman's sore throat. In the ten cases reported by PRICE-BROWN, large nasal polypus, dislocated nasal cartilage, twisted uvula, hypertrophy of faucial tonsils, ulcer of hyoid fossa, septal ridge and spurs, posterior septal catarrhal hypertrophy, pharyngitis granular, and turbinal hypertrophy were found. M. TOEPLITZ.

466. Among the drugs used by SEISS in atrophic rhinitis, thymol

is still considered the best, in watery solution with alcohol and glycerin, or better dissolved in albolene, glymol, or benzoinol in the proportion of from 3 to 10 grains to the ounce ; in combination also with menthol, pine-needle oil, and eucalyptus in the strength of from 1 to 3 per cent. Europhen in ointments or as dusting powder with stearate of zinc or pure is preferable to aristol and iodoform. Cinnamon oil (10 per cent.), added to the ounce of albolene, is applied as antiseptic spray.

M. TOEPLITZ.

467. From a series of practical experiments in the oto-rhino-laryngological clinic at Turin, DE SIMONI confirms the presence of a bacillus in the secretion of ozæna, similar to the diphtheria bacillus, with the qualities described by Belfanti. He values highly the tinction method of Gram-Weigert.

GRADENIGO.

468. GUARNACCIA recapitulates the various opinions of the authors on the so-called caseous rhinitis, and finds that some of them consider the rhinitis as a special form of disease, whereas others take it only for an accompanying affection of different diseases of the nose or its accessory cavities. The microscopical and bacteriological examination of the cheesy matter in his case revealed a special micro-organism, which belongs, according to Professor DE GIASCA, to the species of streptothrix alba in regard to its morphological and cultural qualities. This micro-organism was found in great abundance, and seems to have been overlooked by the authors who have so far studied rhinitis caseosa. It may be considered as the cause of the formation of the specific matter.

GRADENIGO.

469. LANTIN's communications on foreign bodies of the nose, and the 18 cases described contain nothing remarkable. But the exact microscopical and chemical examinations of the dissolved concrements and the nucleus are of interest. The author concludes from his observations that there are no rhinoliths without central foreign body. The numerous bacteria found in each rhinolith have nothing to do with the incrustations of lime, they only furnish passive material. Lantin describes a case of a patient, forty-four years old, who swallowed a needle while eating bread. After one year the broken needle appeared beneath the skin of the neck. An egg shell was lodged in the larynx of a child, one and a half years old, and could only be extracted by tracheotomy.

ZARNIKO.

470. A girl, aged thirty-three years, who acquired syphilis eighteen years previously, noticed suppuration and obstruction of the nose during the past five years. Only the left side was diseased. A sequester of such dimensions was found that, as the temporary detachment of the nose according to ROUGE was not sufficient for its extraction, temporary resection according to OLLIER had to be performed. Behind the first, another sequester, equally large, but more easily movable, was discovered. Both were irregular and black. The exact origin is not stated. The operation did not disclose the origin of the sequester. An examination two months later revealed a perforation in the posterior portion of the septum, and such softness of the middle and lower turbinated bodies that the absence of their bones seemed to be very probable. ZIMMERMANN.

471. Among the cases related by SMITH is that of a boy who had a slate-pencil driven through the hard palate, the upper end of the pencil projecting into the nose, the lower being flush with the palate. Under anæsthesia, a finger having been placed in the post-nasal space, the pencil was divided by means of a pair of narrow bone forceps in the nose; the remaining portion then pushed into the nose by the end of a drill. CHEATLE.

472. MACCOY gives a complete bibliography, with full report of all cases, to which he adds two, one observed by Dr. Arthur W. Watson and one of his own observation. Watson's case was a man, aged thirty-three, with nasal sarcoma of the right nostril, in which a root of a tooth was found to be imbedded under the inferior turbinal. MacCoy's patient, a female, aged forty-five, had presented, after birth, a gathering beneath the right orbit, which for several years remained suppurating, with extensive necrosis of the bones of the face, and had healed with a depression. At the time of birth, two teeth were present on the right side of the upper jaw, just behind the usual place of eye-tooth. The primary dentition was normal, all teeth came except one just back of the right eye-tooth. These teeth remained, but were always bad. There was no second dentition. Offensive catarrh of the right nostril, with occasional discharge of small black pieces of bone persisted. In 1884 she felt a loose gritty bone beneath the right orbit, and also a hard substance in the right nostril. In September, 1895, she presented herself with occipital and temporal headache. A tooth was removed from the right nostril, 4 *cm* behind the vestibule, leaving a depression in the

floor. No necrosis was discernible. The tooth was a permanent bicuspid. M. TOEPLITZ.

473. WATSON excises under cocaine a portion of the cartilage from the protruding part of the septum, without injuring the underlying mucous membrane, straightens the septum with a crushing forceps, and holds the fragments in place by a pin, inserted like that in ROBERTS's operation, as if it would fasten a button-hole bouquet. The operation devised by ASCH, which is now considered the best, is not mentioned in the paper. TOEPLITZ.

474. BOND removed a soft vascular polypus, about half an inch in diameter, which sprang from the left side of the cartilaginous septum. The patient, a man aged thirty, had had severe bleeding from the left nose. CHEATLE.

475. ARSLAN briefly mentions the literature on abscess of the nasal septum, and reports 8 observations of his own. In none of his patients a trauma preceded, not even a deformation of the external nose. Only in 2 cases perforation of the septum followed. Nearly all his patients had some nasal trouble : deviation of the septum, hypertrophy of the lower turbinated body, empyema of the antrum of Highmore, naso-pharyngeal catarrh, etc. Such changes apparently predispose the nose to infection.

476. The elaborate article cannot be reported, must be read in the original. KILLIAN.

477. After an historical review, showing that the trephine (moved by an electro-motor) was much earlier known in America than in Europe, the author recommends the method of ASCH for correction of considerable deviation of the cartilaginous septum (*New York Med. Jour.*, 1890, 20, xii.). Asch incises the septum with a kind of button-hole scissors, makes an incision rectangular to the first over the ridge, forces the fragments through and fixates them by obturators of caoutchouc until they are healed. Narcosis is necessary. Results are excellent. ZARNIKO.

478. With brief reference to literature, ACERBI describes a tumor which suddenly had sloughed from the nose of a lady with rhinitis caseosa. It chiefly consisted of alveolar connective-tissue. The alveoli were lined with endothelium. The point of origin could not be ascertained. GRADENIGO.

480. The pedunculated, pinkish tumor found in the left vestibule of a girl, aged four weeks, was attached high up, possibly to the middle turbinated body, and removed with cold snare and ring knife, whereby free respiration was fully established.

481. A man was operated on by **Bond** for a sarcoma of the nose, the growth having existed for five years. The nose was laid open by an incision along the side at the junction with the cheek, and turned over to the other side. The part of the septum with the growth on it was removed, and the floor down to the bone. The site of growth curetted and burnt with a Paquelin's cautery. No recurrence during five months. **Cheatle.**

482. **Ripault** operated from the canine fossa in six cases. To the well known indications he adds the presence of streptococci. He makes an opening of about 1 *cm* square, irrigates the antrum with a solution of chloride of zinc, scrapes the walls with a sharp spoon, irrigates again all recesses, and introduces a loose (to avoid pain) tampon of iodoform gauze. The tampon is removed after 48 hours, the second tampon remains 4, the third 8 days. As a precaution Ripault recommends drilling the alveolus and introducing a canula for irrigation, in case the large opening should not prove sufficient. The latter did not seem to be sufficient in more than the half of his six cases, thus rendering the term "large opening" rather nugatory. **Zimmermann.**

483. Case 1.—Man, æt. twenty-three years. Pain and swelling of the region of the left frontal sinus for 3 years after sea-bathing. Repeated incisions of the soft parts were not sufficient. Operation : A few sequesters were removed. The frontal sinus contained granulations and offensive pus. Scraping, tamponade. Suture after 24 hours. After about 14 days the wound had to be reopened and thoroughly scraped, and a large opening was made toward the nasal cavity. Recovery.

Case 2.—Woman, fifty-eight years old. The affection existed for 11 years. Large swelling from left ocular angle of the root of the nose, the skin over it reddened. The frontal sinus was opened from in front ; scraping and suture. She died of broncho-pneumonia.

Case 3.—Man, æt. thirty. Affection for 16 years. Marked exophthalmus, especially in the last few years. Opening of the sinus, which contained a thick yellow fluid. Scraping. Suture. Recovery.

Case 4.—Man, æt. twenty-one. Affection for 2 years. Diagnosis : Osteoma of the right frontal sinus, starting from its floor. At the operation a tumor was found of eburneous irregular surface, almost filling the left frontal sinus. It was a typical compact osteoma of the size of a hen's egg. **Gradenigo.**

484. A woman, æt. twenty-two, had chronic hypertrophic rhinitis and purulent discharge from left nostril for years. Several endonasal operations relieved her only temporarily. Therefore opening of the frontal sinus from outside. It was filled with granulations and pus. As the suppuration persisted, the granulations were again scraped out. The probe penetrated through the carious wall into the cranial cavity. Exposure of the dura mater through a wide opening and puncture of the brain did not reveal any abscess of the brain. After a few weeks the same was repeated but with the same negative result. Hemiparesis of the right limbs, later on also of facial nerve. A last attempt to get it under control by evacuation of the ethmoidal bone failed also. Speedy death. The post-mortem examination showed a large abscess in the left frontal lobe and purulent basilar meningitis. The author surmises that there were at first several small abscesses which later united, making a localization impossible during life.
NOLTENIUS.

485. NAIRNE records three cases of empyema of the frontal sinus: in one, necrosis of the posterior wall existed with a large subdural abscess, empyema of the maxillary antrum being also present: in another, a perforation had formed in the orbital wall, with an abscess in the orbital cavity. Recovery in each case.
CHEATLE.

486. BABER'S case was that of a woman, aged fifty-two, who suffered with left frontal pain, fœtid discharge from the nostril, and prominence of the left eyeball. The frontal sinus was opened by a trephine and found to contain clear viscid mucus and cholesterine crystals; the opening in the nose found to be blocked, due in all probability to disease of the ethmoid cells. Communication established with the nose by means of drill and chisel. Suppuration occurring in the sinus, the anterior wall was removed, with the exception of a ridge one-eighth of an inch in height at the lower border; the thickened mucous membrane also cleared away, except that portion overlying a gap in the bony roof of the orbit; the skin and periosteum stitched over, and a drain inserted, healing occurring in about a month. CHEATLE.

487. At a meeting of the Liverpool Medical Institution THELWALL showed a patient from whom he had removed an ivory exostosis which grew from the inner wall of the frontal sinus, and which protruded slightly into the orbit. The patient, a woman forty-six years of age, had received a blow thirteen

years previously. The tumor was bossed and mammillated, and weighed three quarters of an ounce. CHEATLE.

488. MILBURY principally depends for diagnosis of disease of the antrum of Highmore upon transillumination, and prefers to operate through the anterior wall of the canine fossa, making a large opening with the dental burr and chisel with subsequent insertion of a drainage-tube or gold eyelet. He operates under cocaine or bromide of ethyl. Of the three appended cases the first is of interest as one of cancer of the maxillary antrum. TOEPLITZ.

489. 1. A turnkey in a police station exhibited a primary intranasal chancre of the vestibule and anterior portion of the lower turbinated body, transmitted by the finger-nail.

2. A multilocular cyst of the posterior end of the left middle turbinated body without relation to ordinary nasal polypi, which recurred within three months after removal. TOEPLITZ.

490. ROE draws from his exhaustive paper the following conclusions :

1. That deviations of the septum are produced by a variety of causes operating upon different persons, and that upon the same person several different influences may be operating at the same time.

2. That heredity plays a very important part as a predisposing cause, not only by the dyscrasias which may be transmitted, but by the blending of different races in the composite type, which brings about an infinite variation in the conformation of the osseous and cartilaginous structures.

3. That the three local causes most frequently producing deviations, spurs, and ridges of the septum are trauma, nasal obstruction, and unequal growth of the different parts of the vomer.

491. Adenoid hypertrophy, if unchecked, does not leave the pharyngeal vault healthy. The remaining conditions are a permanent enlargement or thickening, genuine atrophy, and Tornwaldt's bursitis pharyngea. DELAVAN sums his paper up as follows : These conditions are common, can be traced back to adenoid hypertrophies, result from the effect of long-continued inflammations, and would have been prevented by the removal of the original adenoid enlargement. M. TOEPLITZ.

492. Contrary to the views of De Santi and others, DICKERMANN concludes, from the careful study of the literature which is fully reported in the paper, that papilloma or papillary fibroma of

the nose is rare. It usually develops upon the anterior portion of the septum from a small base, is slow in growth, and generally appears in middle life. It does not ulcerate nor cause infiltration at its base, and is to be considered as a benign growth. Dickermann reports an observation of his own made in a man aged sixty-two. The microscopical examination is illustrated by a photograph. M. Toeplitz.

493. In order to estimate the amount of nasal obstruction, Wright uses a naso-manometer, made on the principle of the Sass spray-tube, which is filled with carmine-stained water and fitted to a millimetre scale registering as high as 150° ; the manometer is connected with a rubber tube by a slender metal tube. On inspiration the column rises from 5 to 15 *mm*, on forced inspiration from 25 to 40 *mm*, in atrophic rhinitis from 75 to 90 *mm*. Errors should be guarded against. The amount of obstruction to the air-current in the naso-pharynx offered by adenoid growths can be ascertained by the stethoscope, placing the mouth of the instrument firmly against the cheek just anterior to the external auditory meatus. M. Toeplitz.

494. Twenty-one different formulæ of Dobell's solution are given by thirty-one authorities. In some the glycerin was omitted. Pynchon holds that the solution ought not to contain more than one drachm of salt and six ounces of glycerin to the pint. The strength of the carbolic acid must be at least of one per cent. in order to be antiseptic, and, therefore, not be substituted by a milder drug. The solution is to be used in small quantities except in atrophic rhinitis. M. Toeplitz.

495. Ortho-chloro-phenol is more satisfactory than para-chloro-phenol. It is the most powerful astringent, particularly for nasal hypertrophies, also an antiseptic and slightly anæsthetic. In atrophic rhinitis and nasal ulcers a 10 per cent. solution in glycerin is used. Berens has also tried the drug in furuncles of the ear, suppurative otitis media, and laryngeal tuberculosis with good result. M. Toeplitz.

496. Loeb uses the Aloe converter, which can be applied only to the alternating current. It reduces the voltage of 104 to 1, 1½, 2 . . . or 8 volts, and consists of an iron core with a large primary coil of fine wire and a smaller secondary coil. M. Toeplitz.

497. In this report presented to the laryngological section of the British Medical Association, Fraenkel concisely summarizes his views, which are probably familiar to the readers of these Archives. Lacunar angina is an infectious disease. Exposures

(*e.g.* trauma after nasal operations, colds, coryza, etc.) predispose the organism to it. The infectious germs may also be conveyed to the parenchyma of the tonsils through the lymph current, causing a regular tonsillitis, viz., a profuse emigration of leucocytes. ZARNIKO.

498. GOUGUENHEIM reports a case of streptococci angina, terminating fatally by pyæmia. ZIMMERMANN.

499. MEYER found in the lacunæ of healthy tonsils a streptococcus salivæ, similar to streptococcus pyogenes, but not identical with it, and some other cocci, as staphylococcus pyogenes alb. and aureus, and leptothrix. In 14 out of 55 cases of lacunar angina he found the staphylococcus alone, in 24 staphylococcus and streptococcus pyogenes, in 15 the streptococcus pyogenes alone. In 2 cases he found the diphtheria bacillus, once the pseudo-diphtheria bacillus. The author considers the streptococcus pyogenes as the chief agent of lacunar angina. He thinks that the reason why it was not found in the first 14 cases was the unsuitable reaction of the culture soil. Besides the streptococcus, the staphylococcus and pneumococcus may cause the disease, in some cases also the diphtheria bacillus.

ZIMMERMANN.

500. Leptothrix mould was found on the back of the tongue, tonsils, and posterior wall of pharynx. Painting with iodine being without result, COLIN used chloride of iron. The mould turned black within two days and sloughed easily. After three to four paintings fungi could be detected only in the crypts which were difficult to approach. These also disappeared after three weeks of this treatment. ZIMMERMANN.

501. Difficult respiration, especially at night, in an otherwise healthy child. The soft palate and a small zone of the hard palate, a portion of the tonsils, both palatine pillars, and the lateral walls of the pharynx were coated with dense rose-colored elevations of rather solid consistency, about 1 *mm* thick and 3 *mm* long. No ulceration. Naso-pharynx free. The elevations extended on the sides to the larynx down to the false vocal cords (getting thinner and softer), leaving the epiglottis free. This explained the difficult respiration. The suspicion of lues was corroborated by the successful administration of iodine. Improvement after two weeks, complete recovery after four months.

ZIMMERMANN.

502. Elaborate description of two cases of marked tuberculosis of the upper air passages, of which the first represents an affec-

tion of the nose, the naso-pharynx, and oral cavity secondary to phthisis of the lungs and larynx. The other showed an extensive affection of the isthmus faucium and the pharynx, which had to be diagnosed as primary tuberculosis, since there was no other affection to be found. ZARNIKO.

503. In former cases of phthisis MOURET had observed elevations on the tonsils. He saw the same picture in a cook, aged twenty, who suffered pain in swallowing during the last year. On the two pale tonsils (the whole mucous membrane was pale) were situated two or three flattened elevations, almost as large as a peanut, ending in points. They were removed for histological examination. Besides, there were flat ulcers on the margin of the epiglottis, inflammation of the papillæ, and catarrh of the apices of the lungs. The microscopical examination of the elevations revealed giant cells and tubercle bacilli. Mouret is inclined to think that the tonsils might become the seat of primary tuberculosis, and urges further microscopical investigations. ZIMMERMANN.

504. In the first case the primary affection settled in the depth of the left tonsil, probably on the floor of a lacuna, and was just struck in resecting the tonsil, which was inflamed and swollen beyond the median line. In the second case an extensive ulcer with a gray coat and surrounded by hard infiltration was found at the lower pole of the tonsil. Mercurial treatment effected a cure in both cases. ZIMMERMANN.

505. On examining 11 cases of peritonsillar abscesses bacteriologically, LOGUCKI found only in 2 streptococci, in 6 staphylococci, and in 3 both kinds together. From this and the clinical observations he infers: 1. The peritonsillar abscess is a secondary affection, starting from the tonsils and favored by adhesions between tonsils and faucial pillars. 2 The infectious germs emigrate from the tonsillar crypts. 3. The reason for streptococci being in preponderance at the opening of the abscess, and finally becoming less numerous than staphylococci, is probably due to the fact that the staphylococci supplant the streptococci. Hence we can understand that an at first severe process may take a favorable course after the pus is emptied. ZARNIKO.

506. At the microscopical examination of a number of tonsils, RUGE quite often found peculiar glandular formations in the lacunæ (in 4 out of 25 cases, and in various morbid conditions, viz., in 1 case of severe sepsis with follicular angina, in 2 of simple catarrhal angina, in 1 case of tuberculosis of the tonsils

and pulmonary phthisis). They are radiating fungi, but not identical with the actinomyces of man, on account of certain differences in form, reaction to staining fluids, and pathogenic conditions. The author excludes the possibility of etiological relation between sepsis and the presence of the radiating fungi in 1 case, but he does not doubt that the fungus may produce mycosis of the tonsils and pharynx and tonsillar hypertrophy, eventually also abscess and other affections suggested by the cases of Sabrazès and I. Israel, if the fungi were the same in these. In the cases of the author the radiating fungus was found only in the crypts of the tonsils; the consequences were destruction of the epithelium at different places, and partly reactive changes in the surrounding tissue, *e. g.*, emigration of round cells and infiltration. The white accumulations in the tonsillar crypts described by Chiari and Jacobson are probably identical with the actinomyces-like formations observed by Ruge. HAENEL.

507. STIRLING reports 3 cases of bony growth of the tonsil, the first occurring in a young lady, unilaterally, the second and third bilaterally, in brother and sister of sixty-three and sixty-four years of age respectively. They are felt by the finger as hard, immovable masses, coming from behind the tonsil underneath it forward to the level of the anterior surface, and differing in size in each case. In the first case only some pain occasionally originated from the growth. Stirling considers them simply as prolongations of the posterior limb of the transverse process of the atlas and of the styloid process. Surgical interference is not required. M. TOEPLITZ.

508. In an address, delivered at the Surgical Section of the Royal Academy of Medicine in Ireland, THOMSON related 2 extraordinary cases which had occurred in his practice. 1. A gentleman suffered with a growth in the nose; malignant disease of the antrum was diagnosed, and an exploratory operation was performed. The patient refusing to have the superior maxilla excised, the tumor was removed as far as was possible under the circumstances, and pronounced, by Dr. O'Sullivan, Professor of Pathology in Trinity College, to be a round-celled sarcoma. Recurrence occurred in two months. The patient soon after consented to the more radical operation, which was performed; the tumor was found to occupy the whole antrum, to infiltrate the base of the skull, and to have perforated the septum, passing through to the other side. Signs of return occurred in a month, the tumor bulging through the incision and protruding upon the

face. A further operation was found to be useless. The patient himself applied poultices of comfrey root. In about four months' time the patient came to Thomson, the tumor having completely disappeared from the face, all trace of it gone in the mouth, and no pain of any kind. 2. A gentleman, aged seventy-five years, suffered with sore throat for about two months. The right soft palate and a considerable part of the hard occupied by a malignant-looking, flattened growth, projecting for about an eighth of an inch. An ulcer on the free margin of the palate, extending to the tonsil. A mass of enlarged, fixed, painless glands at angle of jaw. Sanious discharge from nostril. Posterior nares blocked. The structures over the alveolar process of the upper jaw, at the posterior part, infiltrated and resisting. Diagnosis of malignant disease. In two months necrosis set in, and the whole engaged structures sloughed away, leaving a ragged chasm, which granulated and healed. The patient is now alive, aged seventy-nine. CHEATLE.

509. After performing laryngotomy, PEARCE GOULD slit the soft palate and removed a fibroma which was attached to the upper vertebræ and extended to the sphenoidal sinuses. The patient was a man, aged twenty-nine years, who had suffered with nasal obstruction, deafness, loss of flesh, and one attack of epistaxis. CHEATLE.

510. At a meeting of the Glasgow Pathological and Clinical Society, Dr. NEWMAN read the notes of the case; the growth was almost limited to the left tonsil, but involved the anterior part of the posterior faucial pillar; there were no enlarged glands. Lateral pharyngotomy, with division of the inferior maxilla at its angle, was performed. No recurrence seven months after the operation. CHEATLE.

Contents of the last number of the Zeitsch. für Ohrenhk.

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VI. Anatomical nomenclature, sanctioned by the Commission of the (German) Anatomical Society, introduced and explained by W. HIS. Reviewed by O. KÖRNER.

VII. The position of the consonants. By F. BEZOLD.

VIII. The recognition of the perforations of the *Mt.* By E. BLOCH.

IX. On a case of acute uncrossed disease of the acoustic, facial, and trigeminal nerves. By D. KAUFMANN.

Systematic report on the progress of otology in the fourth quarter of the year 1896. (Translated in the present number.)

Miscellaneous notes.

Fig. 1.

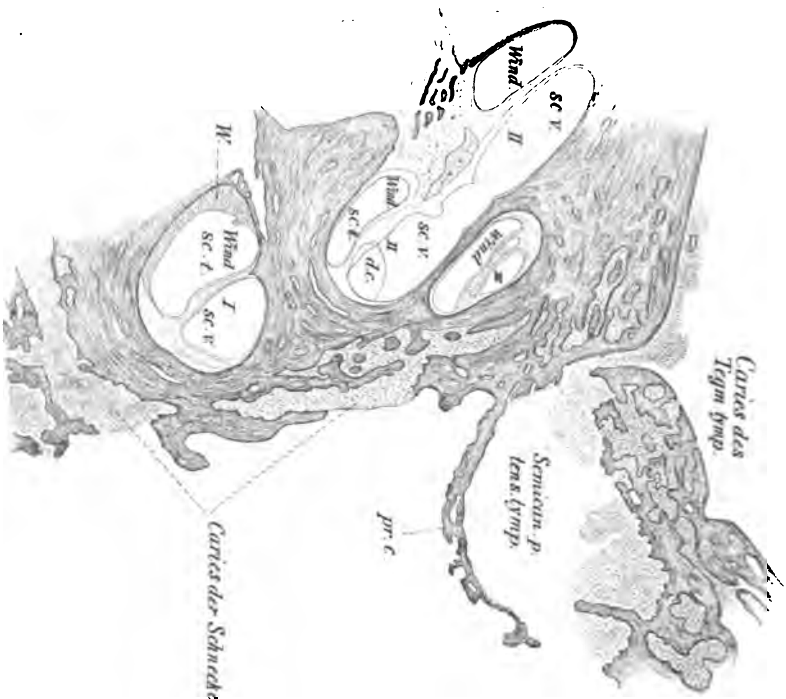

Fig. 2.

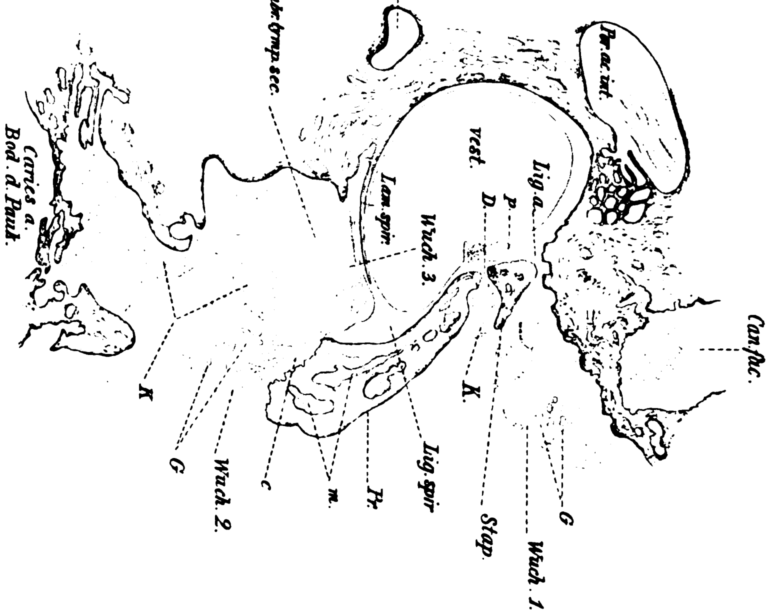

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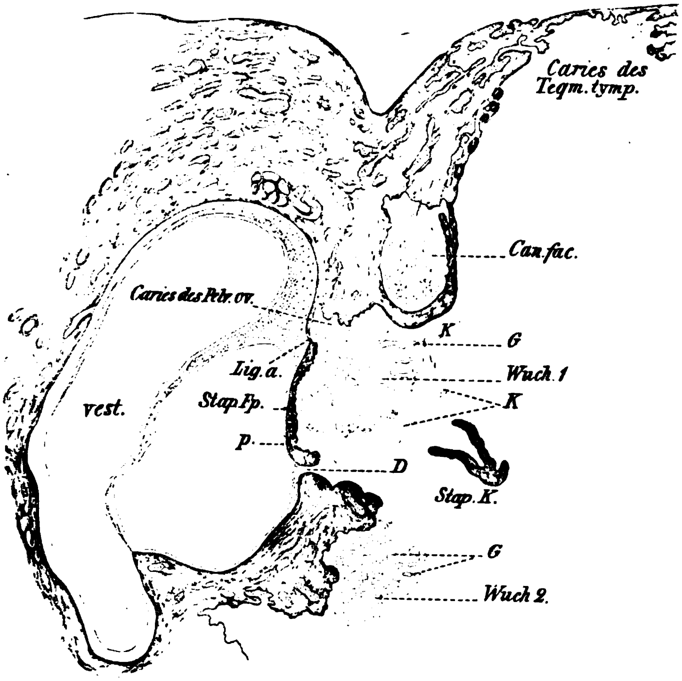
Fig. 3.



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VOL. XXVI. No. 3.

ARCHIVES OF OTOLOGY.

CASE OF CHRONIC PURULENT INFLAMMATION OF THE MIDDLE EAR ON BOTH SIDES,

PROVING FATAL, AFTER SEVEN YEARS, BY EXTENSION, ON THE LEFT SIDE, THROUGH THE LABYRINTHINE CAVITIES AND THE AUDITORY AND FACIAL NERVES TO THE INTERIOR OF THE CRANIUM—OPENING OF THE CAVITIES OF THE MIDDLE EAR—EXPOSURE BY OPERATION OF THE SIGMOID SINUS AND OF THE DURA MATER AT THE FLOOR OF THE MIDDLE CRANIAL FOSSA—DEATH BY CEREBELLAR SUPPURATION AND GENERAL LEPTO-MENINGITIS.[1]

By THOMAS BARR, M.D.,

LECTURER ON DISEASES OF THE EAR, GLASGOW UNIVERSITY.

DR. BARR showed on the 8th February, 1897, two temporal bones, from different cases, illustrating how septic infection may pass from the tympanic cavity and mastoid antrum through the labyrinthine spaces and auditory and facial nerves to the cerebellar cavity. His remarks chiefly referred to one of these, namely: the left temporal bone of a lad, seventeen years of age, who had suffered from purulent disease of both middle ears for seven years, and who had died from cerebellar disease and lepto-meningitis. This bone presented three large operation cavities on its outer aspect; one of them, an inch long by half an inch broad, exposed the sigmoid sinus and neighboring part of the dura mater; a second opening exposed the dura mater over the floor and outer wall of the middle fossa; and a third exposed the cavity of the antrum. The greater part of the posterior wall of the external canal had also been removed by operation, while part of the tympanic wall of the labyrinth was found to be destroyed by caries. In the upper part of the tympanic membrane there was a large perforation, and of the ossicula only the malleus remained.

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[1] Brought before Glasgow Pathological and Clinical Society on the 8th February, 1897.

Pathologically, the most remarkable feature was the existence of a large cavity, lined by a soft membrane, occupying the petrous part and continuous with the antrum,—this was the result of necrotic destruction of the whole of the labyrinth. The only trace of the labyrinth found in this cavity was a small loose sequestrum, consisting of a portion of the cochlea. In the roof of this cavity, corresponding with the position of the cochlea, there was a carious opening, penetrating the bony floor of the middle cranial fossa, but covered by healthy dura mater. The cribriform lamina had been eroded away, the auditory nerve presenting here an abrupt and ragged ending. The stem of the nerve was much thickened, especially just where it had been cut through at the entrance to the internal auditory meatus.

The condition of the facial nerve was also of much interest. In the internal auditory meatus, it was inextricably united with the auditory nerve, evidently sharing in the swelling and the thickening of the latter. At its knee-shaped bend —the geniculate ganglion—where it is joined by the large and small superficial petrosal nerves and the external superficial petrosal nerve, it was denuded of its bony covering by the caries already referred to in the floor of the middle fossa, and it was there directly under the dura mater, while at the posterior part of the inner wall of the tympanum the nerve was destroyed.

The cerebellum at the anterior part of the lateral lobe, in the neighborhood of the internal auditory meatus, was found to be superficially ulcerated, and pus, having a fœtid odor, though not in large quantity, was seen to extend mesially and deeply into the cerebellar tissue. In the meshes of the pia-arachnoid, both on the convexity and at the base of the brain, there was extensive fibrinous exudation, specially marked at the left side of the medulla and pons, where the sixth nerve, the facial and auditory branches of the seventh, the glosso-pharyngeal, and the pneumogastric were entangled in the exudation.

In regard to the history and clinical features of this case, the chief points were: 1st. The existence of a purulent disease in both middle ears for seven years with perforation of Shrapnell's membrane for which all ordinary remedies had been ineffectually employed. Three months before death symptoms of intracranial mischief showed themselves. A large polypus which at that time obstructed the left external meatus was removed and the cavities of the middle ear, including the antrum, were then also freely opened and cleared out. Temporary improvement followed, but on the recurrence of still more marked symptoms of intracranial mischief Dr. J. H. Nicoll freely exposed the sigmoid sinus and also the dura mater lining the outer part of the floor of the middle fossa, but in neither situation was there found any purulent collection or any other sign of disease. The patient died a week afterwards with symptoms of lepto-meningitis. Dr. Barr observed that this is probably a much more common pathway of infection than is usually considered, and in a practical point of view it is very important to determine, in a given case, if this is really the pathway of infection, because such knowledge would throw light upon the nature and situation of the brain lesion. In order to determine this we must not omit the careful examination of the tympanic wall of the labyrinth with the eye assisted by the probe, so as to discover if possible whether the bone here is broken down with caries. We should also, when operating on the antrum, examine closely the state of the posterior part of the labyrinth. If in either or both of these ways the labyrinth is found to be involved in the disease, the probability is that the intracranial lesion is under the tentorium in connection with the anterior part of the cerebellum, in the neighborhood of the internal auditory meatus.

There was no sign of disease in the bone forming the favorite pathway of infection, namely, the groove for the sigmoid sinus, nor in the roof of the middle ear. Evading these the disease penetrated, probably from both the antrum and tympanum, into the labyrinth, destroying the structure contained therein, leaving nothing but the capsule. Afterwards, breaking down the perforated plate of bone through which the nerve enters the labyrinth, the pathogenic organisms travelled along the auditory and facial nerves, infecting first the cerebellum and then the soft membranes of the brain.

While in this case, the situation and character of the suppuration in the cerebellum were such as to preclude operative treatment, it is to be hoped that surgery may yet find a way of reaching and dealing with brain suppuration in the neighborhood of the internal auditory meatus. So far cerebellar suppuration in that situation, if limited in extent, is comparatively inaccessible, contrasting unfavorably with the more common situation for cerebellar abscess, namely, near to and in connection with the sigmoid sinus.

CASE OF CEREBELLAR SUPPURATION CAUSED BY MIDDLE-EAR INFECTION THROUGH THE INTERNAL AUDITORY MEATUS, WITH THROMBOSIS OF THE CAVERNOUS SINUSES, AND BASIC LEPTO-MENINGITIS.[1]

By THOMAS BARR, M.D.,

LECTURER ON DISEASES OF THE EAR, GLASGOW UNIVERSITY.

THIS brain and right temporal bone belonged to a man, forty-five years of age, who died on Wednesday last. They illustrate the effects of purulent middle-ear disease in producing cerebellar abscess, lepto-meningitis of the base, and thrombosis of the *cavernous sinuses.*

Brain.—In the base of the brain an aperture is seen at the front of the right *cerebellar hemisphere*, just where the latter lies in contact with the internal auditory meatus. This aperture leads into an abscess cavity, occupying the greater part of the right hemisphere; this contained pus, which had a most offensive odor. Fibrinous exudation on the pia-arachnoid is seen in considerable quantity over the base of the brain, especially along the vessels in the fissure of

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[1] These remarks were made before the Glasgow Medico-Chirurgical Society in connection with a brain and temporal bone shown to the Society in May last. The case referred to came under my observation after the despatch of the manuscript describing the case preceding this one. It shows a similar mode of intra-cranial infection, namely, by the internal auditory meatus; a mode of infection which my experience shows to be more common than is usually supposed. These cases likewise prove that cerebellar suppuration, or abscess, is not always the result of thrombosis with purulent formation round the sigmoid sinus, and we are, therefore, not justified in concluding that there is no cerebellar abscess, when we find on exposing the sigmoid sinus that this venous channel is intact. This is not quite in accordance with the opinion expressed in the quotation from the lectures of Prof. Macewen, which appeared in these ARCHIVES, in the April number of this year, at page 210.

Sylvius. There is no purulent formation in the temporal-sphenoidal lobe or other part of the brain.

Temporal Bone.—The condition of the temporal bone shows that the septic invasion from the middle ear took place through the labyrinth and internal auditory canal. The auditory and facial nerves in the internal auditory meatus are reddened, swollen, and matted together. The inner wall of the tympanum is eroded by caries, especially in the neighborhood of the fenestra ovalis, which is enlarged by the carious destruction. Behind this the Fallopian canal is seen to be opened by the disease and the nerve exposed. In these ways the purulent disease, which had for years existed in the middle ear, involved the structures in the labyrinth. Another carious aperture is seen in the posterior surface of the petrous bone, just behind the internal auditory meatus; this communicates with the vestibule, and seems to be in the situation of the aqueductus vestibuli. The bony roof of the middle ear and its superimposed dura-mater are free from disease. A large opening is seen in the mastoid, made, two weeks before death, by operation through intensely sclerosed bone; in this way the antrum was reached and thoroughly cleared out.

Condition of the Sinuses.—There is neither thrombosis of, nor purulent formation around, the sigmoid sinus, indeed *there is no sign of disease in the sinus or its bony groove.* A very important feature, however, is the existence of distinct thrombosis of the cavernous sinuses on both sides in which a firm ante-mortem clot was found. In connection with this the following report by Dr. Leslie Buchanan of the examination of the optic nerve, its sheath, and the posterior segment of the eyeball, is instructive.

" There are rather more than usual round cells following the connective tissue of the optic nerve, indicating an early stage of inflammatory action. The most noteworthy change is in the optic nerve, where patches of fibrino-cellular material are found fixing the sheath to the nerve itself. From its shape otherwise it is judged that the sheath of the nerve contained more fluid than usual. The intra-ocular extremity of the optic nerve shows evidence of œdema by separation of the fibre, but there is no evidence of other inflammatory change, such as a cellular infiltration, of either the optic-nerve entrance or of the retina. The choroid shows some slight overfilling of the vessels, but no other change. There is no appearance of any inflammatory change round the sheaths of the ciliary nerves. The changes in the optic-nerve sheath are evidently in an early stage, and there can be no doubt but that a few hours later the signs would have been much more manifest."

Synopsis of Symptoms.—The patient had a purulent disease of the right middle ear for five years before death, with the hearing practically gone in that ear. Polypoid growths had sprouted out from time to time for months before death. They were cauterized by his family doctor, and snared at the Ear Hospital. The external meatus was also considerably stenosed. The symptoms connected with his last illness began five weeks before death. These symptoms were: giddiness so severe that he had to be helped in walking; intense pain, first in the ear and then in the head, affecting both the frontal and occipital regions, and persisting so long as consciousness lasted; one rigor, not severe in character, occurring at an early stage. Temperature ranging from the normal to a hundred degrees Fahrenheit, till a few hours before death, when it mounted very high. Pulse tended to be subnormal, ranging from 50 to 76 in the minute. Delirious excitement latterly supervened, terminating in complete coma twelve hours before death. *There was neither sickness nor vomiting.* The eyes were examined several times, the last examination being made thirty-six hours before death. Neither optic neuritis, disturbance of the pupils, nor paralysis of the ocular muscles was found at any of these examinations. Soon after the last examination, however, distinct protrusion of the eyeballs began to be noticed. Unfortunately, the fundus of the eye was not examined after this phenomenon appeared. From the condition after death already referred to, changes in the fundus would no doubt have been observed had an ophthalmoscopic examination been made later on. The thrombosis of the cavernous sinuses was probably a later phenomenon, otherwise we might have expected thrombic changes in the sigmoid sinus.

POPULAR MEDICAL SUPERSTITIONS CONCERNING THE DISEASES OF THE EAR, NOSE, AND THROAT.

BY DR. KARUTZ, OF LUEBECK.

Translated by Dr. J. A. SPALDING, Portland, Me.

VARIOUS ethnological investigations made for other purposes have accidentally furnished me with considerable material regarding popular medicine, and especially regarding otology and its allied diseases. All of us know from daily experience something of the common popular remedies, but a few may be interested to hear a little more of the curiosities of country practice, or to study a little deeper the mass of superstition which still exists so abundantly in the backwoods and uncultivated portions of the earth, and which so obstinately resist suppression by the medical or public press.

Before studying the actual *treatment* of diseases of the ear, nose, and throat as popularly carried out, and as based on a foundation of superstitious ideas, misunderstood occurrences, or half-correct observations, and which, thanks to blindly trusted tradition, have maintained their position for centuries, the popular *prophylaxis* of our specialty deserves a few words. This, of course, moves along parallel with the popular idea of the etiology of diseases, and reveals reflexes of the heathen creeds, despite the regeneration and leaven of later Christianity. Thus gold, silver, and lead ear-rings are still used all over Germany as protectives against diseases of the ear, and it is probably less the derivative action of the incision or its permanent irritation, than the remnant of an ancient medical *treatment* which, to this day, prevents popular confidence in these rings from being shattered. Furthermore, in Bavaria we meet with the widespread myth regarding the *transmission* of ear disease, which insists that lead ear-rings shall only be worn a little while, and then, without a word, thrown over the head or left shoulder into running water.

Similarly, we find bracelets made of amber enjoying great renown amongst those suffering from diseases of the ears. The people of East Carinthia also take the greatest care not to cleanse the ears of their children after they reach the age of one year, lest they should begin to "run." In Bosnia, we hear that one must not step on a bit of bread, lest deafness ensue and remain for life.

Amongst affections of the nose we learn a great deal curious about epistaxis. Thus he who suffers in this way ought to offer as a sacrifice a ball of red silk. A dweller in the Canton of Berne, who finds his nose swollen on arising in the morning, refers it to the breath of a witch in the night. In Prussia a child remains forever protected from a bad neck, that is to say, a sore throat and nose trouble, if the mother, at her first communion after her delivery, breathes three times on the child's neck. In the Tyrol, popular belief insists that one should swallow three palm branches or pieces of the same (after being blessed by the priest) to ward off sore throat, and in Mecklenburg they bind a blue woollen thread about the child's throat.

When any one who has the influenza accidentally speaks of his affliction, then he should silently say to himself, "Complain to the Stone, And leave it alone." The catching of colds is often ascribed to having stepped over some spot dirty or befouled with dung. The actual word is unclean, which sounds sanitary, but probably means anything impure or heathenish, as opposed to Christianity. A popular idea forbids a pregnant woman from holding her nose at a bad odor, for if she should do so, the child will always smell out of his mouth instead of his nose.

A curious idea in Chemnitz is that a child which smells at anything before it is a year old will never smell again. And whoever smells of flowers which have grown on a grave, or of orange flowers which have decorated the body of a child in its coffin, loses his sense of smell for life. In Mecklenburg you will get cancer of the nose if you smell on St. John's day of a flower on which a cricket has rested or over which he has been seen to fly. In Bohemia you can protect yourself from hoarseness if you cry loudly with the first croaking of the frogs that you hear in the spring. And, finally, in a prophylactic point of view, you must keep out of your ears the bloom of the buckwheat flower, or be deaf forever.

Suppose now that, despite all methods of prevention, or owing to neglect of the same, sore throat or pain in the neck and hoarseness appear, then gargling with sage and honey is valuable. Only, to do good, the gargle must be swallowed. In some regions a favorite gargle is a decoction in hot water of a handful of house leek with six living crabs. Children must not gargle but drink the remedy through an elder sprig from which the pith has been taken, elder being, from time immemorial, a sacred shrub.

Everywhere we hear of an old stocking for the throat, the idea probably arising from the constant and uniform warmth which it affords to the parts. Then, later, came the hocus pocus that the stocking, to be of any good, must have been worn and on the left foot only, and then turned inside out. In the same line of treatment, we mention a string stolen from the mouth of a meal-bag whilst still in the mill, a silk garter, unboiled flaxseed, the teeth from a pike, and the brains from a black cat, all of these being useful for children. The Wends believe in the use of a piece of meteoric stone, or a bit of a prehistoric stone axe, tied about the throat. In Halle they stroke the neck of a corpse of the opposite sex, and so cure a sore throat. Or, internally, they use the seeds of the thistle beaten up in brandy.

In case of mumps, a handful of silver- or hazel-thistle can be brewed in butter until it is soft, and then, wrapped in a soft linen cloth, it is placed on the swollen gland.

Canker of the mouth, in Schwabia, is cured by this exorcism:

Oh! Holy Job went into the land,
He held his cane straight in his hand.

Why, then, art thou sad?
Because my mouth feels bad.
Then take some water in thy mouth,
And let it run right down the spout.
And now, in the Name of the Holy Trinity, stop aching!

This has to be repeated several times daily for three days in succession, and at the mention of water into the mouth, you wash the mouth freely and then spit it out. If a child has the same disease, you must breathe forcibly into the mouth before you have had anything to eat in the morning, and then go and tie up in the chimney-place, till they rot, seven wood-bugs.

Diseases of the nose amongst the people are all "colds in the head" or "nose-bleed." In case of a baby with snuffles, rub goose-grease or suet over the region of the nose. In Bohemia, no one with a cold in his head dares to cross running-water, for, if he does, the cold will never leave him. A woman in Chemnitz, with a cold in her head, will smell of her husband's shoe when he lays it off at night, whilst in Mecklenburg she must do this three times in succession, and then, additionally, smell of the inside of the left stocking when that comes off. The good people of Pforzheim, with a cold, drink all liquids through a three-tined fork.

The idea of disease-transfer to another person is one that is widely spread. Thus, to transfer to another a bad cold in the head, all that is necessary, in Thuringia, is to blow the nose three times in succession through the ring on the door which they use as a handle or knocker. The person who next takes hold of the ring will catch the cold. Or the nose can be blown forcibly into a bit of paper, into which you next wrap an old copper coin, and then throw paper and all into the road behind you, and without looking to see where it falls. Whoever picks up the paper, and out of curiosity opens it, catches your cold. And again, blow the nose into another person's shoe, and when he puts it on, he gets the cold. Finally, Pliny proposes to get rid of the affliction by kissing the nose of a mare.

There are innumerable remedies against the nose-bleed. Harmless as this generally is, the occurrence is often ascribed to demonic influence. In the Pfalzburg and other countries, some one in the family is sure to die soon if, from the nose of one of that family, three drops of blood, and three only, fall from the nose upon the hand. Whoever bleeds from the left nostril will have bad luck in all his affairs. In the Rhineland, if one of a pair of lovers happens to lose three drops of blood from the nose, the love between the couple is sure to be broken.

In the same way as great significance is laid on epistaxis occurring, so great influence is laid on charming it away, the number of exorcisms for which are countless. In Mecklenburg, for instance, they take a bit of stubble mown with a scythe, and write on the forehead of the person bleeding, the mysterious words "Uhi Upuli."

In the Aargau region they declaim:

> "Oh, let it rain long as it will,
> And let the brooklet run its fill;
> But when the rain has fallen enough,
> It soon will stop of its own free will."

In Westphalia they say:

In God's Garden there are three roses; one is God's Goodness, the second is God's Garland, and the third is God's Will. So, Blood, I command you to stop bleeding, and in the Name of the Holy Trinity stop!

Or here is another:

I once went into the street and found blood and water. The water I let flow, but the blood I ordered to cease, and now, in the Name of the Father, the Son, and the Holy Ghost, I say, Blood; stop!

In Schwabia they say:

On the grave of Christ grow three roses; the first is white, the second is red, and the third is God, who will stop this nose bleeding.

The Mecklenburger lays his right hand over his left, and then, with the hands so placed, he strokes the bleeder down the back, and says: "Blood stand still. For it is God's WILL."

In addition to these incantations many people resort to usages which are inclined to the mystic. Thus you draw a leg from a footstool, or a round from a ladder, moisten it with the blood trickling from the nose, and then drive it back into its former position. In Luebeck they pick up three stones from the road, let fall a drop of blood on each one, and then gravely and silently replace all three stones in their former dust. In Franconia a drop of blood is put on a stone taken from a grass-plot, or from under the house spout, then the Lord's Prayer is said, and the stone replaced.

In Holstein they take a wooden bolt from a carriage or chair or ladder, let a little blood from the nose fall on one end of the same, and then they return the object to its former position though in the opposite direction from that which it originally occupied. *Here we see the transfer to inanimate objects instead of to persons.*

A nose-bleed in Steiermark can be stopped by fastening around the little finger of the left hand a piece of red thread. But the Holsteiner asserts that this is useless, unless you wind the red thread on the little finger on the hand opposite the nostril affected with the bleeding. Or one can raise the arm opposite the nostril bleeding, and also hold upright the middle finger whilst the other hand is held limp with the middle finger outstretched. Some people throw cold water into the face, or down the neck, or camphorated brandy on the whole spine. Or they press violently a copper coin into the root of the nose, or a large door-key against the neck. Occasionally we hear of the nuts of cherry-stones and almonds being cracked, then mixed with bitter vinegar and rose water, and then all hanged in a bag behind the back of the neck. It is a good plan, too, to hold a blood-stone or the roots of a corn-flower which was lifted from the ground on Corpus Christi Day, in the hand until they are warm. In Silesia, the corn-flower is of no use unless gathered on St. John's Day, at midnight, and then kept on hand till needed. Burdock roots can be held in the hand, or put into the shoe and walked on for several hours, or blotting paper can be tried under the tongue, or a dried turtle placed in the axilla for so many hours.

In Bosnia they let a drop of the blood from the nose pass through a ring that has been taken from the right hand of a corpse, or the blood can be let fall on a cross made of straw or wooden matches. In Holstein, they let fall precisely three drops on the straw cross, and then three more crosswise, but elsewhere they lay two straws across one another, and then jump over the cross. In other countries they catch some blood in an egg-shell, and then place shell and blood on burning coals. When the shell is burnt, the bleeding will cease. Or the blood can be mixed with a little white of a fresh-laid egg and then mixed with hot ashes, and then burnt in an egg-shell, and as the smoke arises the substance is stirred about with a white shaving, and finally the bleeding ceases. In Mecklenburg it is an odd custom for a girl who is a stranger to the family to which the nose-bleeder belongs, to spin a thread incorrectly, then to write with the running blood the given and family name of the person affected on a piece of paper, and then hang the paper with the thread around the patient's neck in such a manner that it hangs under the left axilla for the right nostril bleeding, and vice versa.

Finally, so far as *epistaxis* is concerned, omitting many prescriptions mentioned by our author, we refer to the Schwabian custom of snuffing up dried pigeon's blood or moss from the skull of a malefactor who was hanged, or holding beneath the nose the dung of an ass or grass-fed pigs, mixed with vinegar, or finally bits of alum may be passed into the nostril.

The *hearing*, if affected; can be relieved by dropping into the ears, for several mornings in succession, the juice of unripe grapes mixed with honeysuckle water.

The "Ear Worm" has from ancient times been very popular. He is supposed to crawl from the brain into the ears and make them deaf, and noisy. A very old cure for this was to hold yeast in front of the ear affected, and so to entice the worm into the passage, whence he could be extracted with needles and forceps.

For pain in the ear or earache there are innumerable remedies, amongst which we recall the oils of almon, olive, and rose.[1] Next comes the use of warm milk, mother's milk being preferred when obtainable in the family. Then the urine of various animals enjoys great renown, that from children being preferred, though that of goats, boars, and calves is highly thought of. So too, we hear of essences from the gall-bladder of the beaver, from myrrh, the spirits of ant-hills, and the gall-bladders of the pig, bull, or mouse mixed with vinegar and then rubbed up with milk or garlic juice.

In Bavaria, pain in the ear is best relieved by the use of hot bread made into a poultice, but to be most useful the bread must have been got by begging for it. In Chemnitz a favorite remedy is a pair of old trousers tied about the head, or earth-worms and ant-hill debris boiled in Benedictine and then dropped warm into the ear. In East Prussia they tie a leek in linen and push it into the ear whilst hot. Fomentations are also highly thought of, the best being those from vermouth and cummin seed.

The Bohemians charm away an earache in this curious and unique fashion: The patient lays his head on the table, the painful ear up, and into it they place a pewter funnel with an inch or two of cold water in it. Then they melt lead and pour it into the opening three times in succession. The noise made by the explosion of the steam resounds like cannon in the ears, and a cure is soon obtained.

The same remedy can be used in tinnitus, and is then considered very useful, one noise counteracting the other. Or use is made of geranium, leek, and onion leaves compressed and the juice dropped in. The Egyptians rely on the leaves of the wild spikenard and peppermint. The Wends cut green pumpkin-stalks, and burning them, the smoke is blown into the ear.

Pliny recommends for deafness the fat of dogs mixed with vermouth, goose-fat, and onions. Or the house leek can be crushed between two flints and the juice dropped into the ears. The Bavarians think highly of old watchmaker's grease. The Schwabians think most of the gall-bladder, and they distil it from the trout, eel, hare, or raven, with brandy, and use it hot. Or, best of all, is to find a fish inside the stomach of a pike, then to pulverize that finely, and give it two mornings in succession to the patient whilst fasting.

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[1] In Potland and its vicinity shark's oil is much used to the present day as a popular remedy for deafness, and still more for noises in the ear; also when hot, for earache.

If any animal has crawled into the ear, the best way to get rid of him is to use the gall of a mouse mixed with oil, but if cold water has run into the ear and made it ache, the best remedy is hot goose-fat with onion juice.

When the ear suppurates, great reliance is laid on decoctions of gall-bladder with various roots and leaves. Thus spicknel with the gall of a young ox, mixed up with honey or the shell of a pomegranate added is good. Amongst the curiosities discovered in the traditions for suppuration we mention old snake-skins, fat ham, fresh donkey-dung, foam from a horse's mouth, fresh butter, tallow from the ox, fat from an ass, the gall-bladder of a he-goat, dung from a goat mixed with wagon grease, the testicle of a fox, the tripe of a hen dried and mixed with wine, the fat from a pullet, the fat from a wood-louse running out when the head is crushed, and the ashes from fresh horse-dung mixed with oil of roses, to say nothing of colt's foot juice, onion juice with rose water, or iron filings mixed with vinegar. Endless, as one can see.

Finally, we may mention as a heroic remedy (though neither aseptic nor appetizing) for suppuration from the ears, and one practised to-day in Morocco, where the syringe for cleansing the ear is compensated for by some acquaintance, who fills his mouth with oil, and then, with great skill, acquired by long practice, spits it forcibly into the affected ear.

Note by the Translator.

According to Sir William Wilde, earache is cured in Ireland by putting into the ear-canal some wool taken from the hind leg of a black ram.

In my own city, the common earth-worm is still used extensively as a heroic remedy in cases of earache, being cut into small pieces, then wrapped in fine linen, and forced into the ear-canal so as to fill it even. There it remains until the decaying matter becomes immensely offensive to the unfortunate physician, who is finally called upon to syringe it away to cleanse the ear and enable him to see what has taken place.

Finally, my little house-maid, not long since from Ireland, volunteers to me that on St. Blasius' Day, which is, I think, the 3d of February, if you have your throat blessed by the good priest you will have no sore throat for the rest of the year. Her father forgot to have his throat blessed one St. Blasius' Day, and he suffered, more or less, a whole year, in consequence of his neglect.

REPORT OF CASES OF COMPLICATIONS OF MIDDLE-EAR SUPPURATION.[1]

By Dr. CHARLES A. THIGPEN, Montgomery, Ala.

WHEN I concluded to present a paper to this distinguished society, I selected the subject of otitic brain disease. But on investigating it more closely, I found the short space of time I had at my disposal would not give me the opportunity to do the subject justice, especially when it has already been so ably presented.

It is the purpose of this paper to report a few cases of complications of middle-ear suppuration, with a view of eliciting expressions of opinions upon them, and further discussion of the subject.

Case I.—**Empyema of Mastoid—Extradural Abscess—Operation—Recovery.**

On June 30, 1896, J. G., male, white, aged thirty-eight years, consulted me for pain in the right side of head and earache, and at the same time directed my attention to a small swelling situated behind the ear ; patient also stated that at times he would grow very dizzy. About five or six months previous to his visit to me, he had an attack of la grippe, complicated by earache, and later a discharge from his right ear, which disappeared after a few days. More recently he has had chilly sensations, followed by slight elevation of temperature. The patient presented a somewhat emaciated condition, and upon examining the region complained of, I found the following: Drum membrane lustreless and a minute perforation in membrana flaccida, hearing distance,—watch at two feet. Inflation of middle ear successful, and no perforation whistle. His temperature was 101⅗°, pulse 100, and over a small area corresponding to the temporo-occipital suture there was slight swelling and tenderness. In the immediate vicinity of the external auditory canal, the mastoid antrum and apex of the mastoid, there was no tenderness on pressure. I attached but little significance to this swelling, thinking that it might be a small periosteal abscess, and so expressed my opinion. I advised an incision, however, as this was indicated, and at the same time I could examine the condition of the bone. This he said he could not have done without ether, so I consented to give it to him. Having moved him to the city infirmary, and all preparations made for the operation, I made an incision down to the skull, and a small amount of dark, thick, offensive pus escaped. Having sponged all pus and blood away, I examined the parts more closely, and detected a small fistula through which pus exuded. Following this with my probe, I entered the cranial cavity, and came in contact with a membranous surface ; with the gouge I easily enlarged this fistulous opening, the bone being soft, when the lateral sinus and dura were exposed. In the sulcus for the lateral sinus there was pus, which came from the mastoid, which had perforated backwards. I then opened the antrum of the mastoid, the incision being enlarged, and there found a quantity of pus and granulation tissue. The sinus was not affected, so it was left undisturbed. The wound was cleansed, and a light packing of iodoform gauze, with the regular antiseptic dressing, completed the operation, and the patient was placed in bed. He came from under the anæsthetic well, and rested comfortably until I saw him again at 6 P.M., when his temperature was 99⅗°, pulse 100, and he was comparatively free from pain. July 2d, record shows a comfortable night, with the exception of slight throbbing and aching in the region of the wound, temperature 98⅘°, pulse 88. 6 P.M., temperature 99⅗°, pulse 94, respiration 20. July 3d, 8 A.M., temperature 98⅕°, pulse 78, respiration 18. Wound was dressed, and dressings were very little soiled. Appetite began to improve, and nourishment was well taken. From this time forward patient steadily improved, and was so well on July 8th that I consented for him to return to his home in a distant part of the State. Occasional reports were favorable, and when seen six months ago was quite as well as ever, and hearing distance was normal.

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[1] Read in abstract before the American Laryngological, Rhinological, and Otological Society, Washington, D. C., May 2, 1897.

This is a case where the mastoid perforated posteriorly, with an escape of pus along the groove for the lateral sinus, an extra-dural abscess in posterior cranial fossa, and subsequently a spontaneous opening externally, which nature had made along the course of least resistance, at the suture formed by the junction of the temporal and occipital bones.

CASE 2. — **Mastoid Empyema — Operation — Apparent Recovery — Three months later marked Cerebral and Pyemic Symptoms—Removal of Carious Bone and some Offensive Fluid, evidently from Meningeal Inflammation—Recovery.**

I. H., female, black, aged three years, came to my office August 1, 1896, for a pain and swelling around the ear. The mother stated that since birth there had been a discharge from the right ear, which she did not think was anything, and allowed it to take its course. A few months ago the child began to suffer from earache, and shortly afterwards there appeared a swelling behind the ear which extended downwards in the neck, and a little later an opening occurred just in front of the anterior border of the sterno-cleido-mastoid muscle, and has been discharging from this point ever since. The evidence was very plain that she had mastoiditis, and an operation was advised, which was performed the next day by my brother, who removed the entire external plate of the mastoid bone. This was all soft and readily came away by the use of the curette. The tympanic cavity was also entered, and the carious ossicles were removed. From that time until three months later she rapidly improved, all swelling disappeared, and she was thought to be well, and accordingly discharged. A short while afterwards, to my surprise, her mother called at my office and stated that the child had a hard chill the day before, and all of her clothing was saturated from perspiration ; she suffered considerably with headache, and was delirious at times. I went to see her at once, and found her with a temperature of 106⅗° pulse and respiration very rapid, and she was apparently suffering great pain. Remembering how thoroughly the diseased bone and tissues had been removed three months before, I hesitated somewhat in making a diagnosis of thrombosis of the lateral sinus, and concluded not to operate again until I was thoroughly satisfied that her case was not one of malaria. With the hope of it being the latter, I gave her a cathartic and ordered quinine afterwards. This had no effect, and she again had a hard rigor with a sudden rise of temperature, and I was sure some acute cerebral complication was taking place. Being now convinced that a second operation was necessary, she was sent to the colored infirmary and all preparations were made. A large incision was made corresponding to the old scar from the former mastoid operation, which was joined by one at right angles extending backward for two inches. All hemorrhage being checked, the lateral sinus was exposed, and a sterilized needle introduced and some blood withdrawn. This was found to be normal, and no further interference with the sinus was made. The bone around sinus was carious and soft, and there was a small amount of an offensive serous fluid, which evidently came from meningeal inflammation. At this period of the operation the patient began to grow very weak, respiration bad, and almost pulseless, and I concluded to do nothing more. I turned my attention to the dressing of the wound, while she was held with head downward by an assistant, so that she might not die on the table. Having completed the operation she was placed in bed, the head inclined downwards, and vigorously stimulated. For two hours there was very little evidence of reaction, and I thought she would die, and accordingly left instructions with the nurse to telephone me on the moment of her death, as I wished to make an autopsy. Not hearing further from her, I made my usual evening visit, and very much to my surprise and gratification, I found the patient fairly well reacted and taking some nourishment. From this time on she made an uninterrupted recovery, and I discharged her quite well.

This case presents the following instructive points: The apparent cure of her mastoid trouble, while in the midst of health, the onset of the violent cerebral and septic symptoms, which rapidly disappeared from simply exposing the lateral sinus,.by the removal of diseased bone, and the liberation of a small amount of inflammatory exudation.

CASE 3.—**Chronic Suppurative Otitis Media with Mastoid Involvement—Extradural and Cerebral Abscess—Operation—Autopsy.**

October 31, 1896, was called in consultation to see J. C., whose family physician (Dr. Seelye, of Montgomery), had given me something of his history and symptoms, and before I reached the house my diagnosis was practically made. The patient was nineteen years of age, and up to the previous April had enjoyed good health, with exception of colds and earache and, as the family expressed it, "risings in the head." This condition had continued, with intervals, since he was six years of age until his last attack, from which his ear did not recover, but continued to discharge, and to which he attached but little significance. More recently, he has suffered from constant headache, and at times would become very blind and dizzy, with nausea and vomiting. These symptoms were ascribed by his family to biliousness, and his ear received no attention. Notwithstanding the treatment for biliousness, he continued to grow worse, when his family physician was called in, who realized that he had some grave cerebral complication. On my first visit, I found the patient in a stupor from which he could be roused with greatest difficulty, and all questions put to him were either unanswered or very unintelligently so. His temperature was 102°; his pulse, 84; respiration, 20, and regular. Upon examination of his ears I found a very offensive discharge from the left, and the region over the mastoid painful on pressure; there were no paralyses of the ocular muscles, and the pupils responded well to light. It was my opinion that he had mastoiditis with intracranial complications, and the prognosis very unfavorable, and any procedure for his relief only speculative. His mother being a sensible woman, she readily consented to an operation, and he was accordingly removed to the city infirmary and prepared for it. On the morning of November 1st his condition was about the same as the previous afternoon; temperature, 100°; pulse, 100; respiration, 20. My intention was, first, to open the mastoid, which I found thickened and sclerosed, and which contained a small quantity of very offensive pus; next, the lateral sinus, which I exposed and explored and found healthy. I then continued my incision forward along the zygoma, to explore the middle cranial fossa, which I did by perforating the temporal bone above external auditory opening. No sooner had I penetrated the cavity than a considerable amount of dark, offensive pus escaped. With light sponging all of this was removed, and the probe passed in every direction. The dura around this point seemed firm and intact, with no evidence of further existence of pus. As patient began to grow weak, it was thought best not to continue further interference, so after completing the dressing he was placed in bed and stimulated. He reacted well, and at 1 P.M. his pulse was 100; temperature, 100°; respiration, regular. Later in the afternoon there began a slight twitching of right side of face, which continued for twenty minutes. 6 P.M., temperature, 102°; pulse, 100; respiration, 24; recurrence of twitching; swallows with difficulty. November 2d, 8 A.M., temperature, 99⅘°; pulse, 90; respiration, 22. Twitching of right side of face continues, and patient takes very little nourishment. 6 P.M., twitching of right side of face continues, with slight convulsive movements of right arm. November 3d, the twitching of face and convulsive movements of right arm were so pronounced that I decided to open the skull over the motor area for the face and upper extremity of right side. His temperature, pulse, and respiration being favorable for further interference, he was conveyed to the operating-room at 4.30 P.M. and anæsthized. The ordinary incision for opening the cavity of the skull was made corresponding to the entire length of the fissure of Rolando, and the trephine placed over the lower one third. A plate of bone was removed, and this opening was enlarged anteriorly by the rongeur. The dura was exposed and showed no pulsation. A sterilized needle was introduced, and a thick, creamy pus was withdrawn. An incision about two inches in length was made through the dura, and about two ounces of thick, offensive pus escaped. Search was made for more in every direction, with negative results. The wound was dressed as usual, and patient placed in bed. He was some time in reacting from the operation, and no sooner had the effects of the anæsthetic passed away than violent convulsions of his entire right side began. This condition continued, with short intervals, during the entire night, and until 7.40 P.M. of the next day, when he died.

Autopsy.—Brain was removed and attention was at first directed to the region of the middle ear and mastoid. There was a small fistula through the tegmen tympani, through which pus entered the middle cranial fossa. Between the dura and the internal osseous wall there was a small space where the pus lay, which was removed at the first operation. This was securely walled in by nature on all sides. The dura was intact and firm, with the exception of a dark spot which corresponded to the fistula in the bone. Corresponding to this spot in dura and in bone there was also one at the base of the temporo-sphenoidal lobe, which was gangrenous. This was easily pushed through with the probe into a large pus cavity, which was incised, and a great amount of thick, offensive pus escaped. This was a case of chronic middle-ear suppuration, complicated by mastoiditis, which existed for years, and later there was established a fistulous communication with the middle cranial fossa, the formation of an epidural abscess, abscess of the temporo-sphenoidal lobe, a localized purulent meningitis, and death.

CASE 4.—**Purulent Otitis Media—Paracentesis—Opening of Mastoid; no Pus found—Typical Pyæmia—Recovery.**

About December 1, 1896, J. T. G., male, white, aged thirty-seven, had an attack of la grippe, which affected the accessory nasal cavities. There was considerable constitutional disturbance and prostration. A few days after this, he began to suffer with earache and pain in the right side of head, which steadily increased in severity up to the time I saw him. Examination of the ear showed a red and bulging membrane; region behind the ear very sensitive on pressure. Paracentesis of tympanum was performed, with escape of a sero-purulent fluid, and patient expressed himself as being very much relieved. I instructed him to remain in bed, use hot applications to his ear, and warm gentle antiseptic douches in ear canal. Improvement was steady for a few days, when he began to suffer again, and nothing but opiates would relieve him. His temperature ranged from 101° to 104°, and his pulse was very rapid, and his head symptoms were so violent that I feared meningitis. I advised opening the mastoid, with the hope of finding the cause of his agony there. He readily consented to the operation, and at 4 P.M. of December 29th I did the usual operation for mastoiditis. His temperature at that time was 102⅗°; pulse, 120; respiration, 24. On opening the mastoid, I was surprised to find no pus. I removed the outer wall, and sought in every direction, thinking that there might be some hidden cell filled with it, but none was found. Having promised him to open the mastoid, and no more, I did not explore the cranial cavity. The wound was dressed in the usual manner, the patient came out well from ether, and I left him in charge of the nurse. My next visit, the following morning, the patient stated that he had a comfortable night, without the slightest pain in ear or head, and from that time he has never had a recurrence of his head symptoms. But his temperature continued, ranging from 100° to 104°, and each time I saw him, he presented more and more the aspect of a septic patient. On January 3d, he complained of pain in his left leg, but there was no redness or swelling there. The pain increased the next day, however, and on inspecting the leg carefully, a slight redness and swelling existed over the inner side, which increased in area very rapidly. Evaporating and antiseptic lotions were applied, with bandaging, which made him more comfortable. Two days later he had a slight rigor, followed by profuse sweating, and I was sure he had an abscess somewhere. On directing my attention again to his leg, I found an abscess of the cellular tissue, which I opened, and I felt sure that my patient would now recover. This opening led into a blind fistulous canal which extended as high as the popliteal space. A counter-opening was made here, and a drainage tube inserted. The patient rapidly improved for a few days, when he experienced pain in right shoulder. Upon examination I detected redness and swelling over an area corresponding to the deltoid muscle, which was also incised and treated as usual. A short while after this, he began to cough, followed later by mucopurulent expectoration, evidently from a small pulmonary abscess. The course of this case was a very prolonged one, occupying a space of over three months, being discharged well on April 1st.

A case of typical pyæmia. Aside from its origin, it presented nothing more than ordinary interest. It is of interest to otologists because of its aural origin without mastoid suppuration. Through what channels the septic matter passed, and just how systemic infection occurred we can but suppose that it was through the lateral or the petrosal sinuses.

In the management of intra-cranial complications of middle-ear suppuration, I believe we should follow the old maxim: Wherever there is pus it should be liberated, and its source sought. That if obscure symptoms mask its location, exploratory measures, when aseptically practised, can do no harm, and if there is any class of cases where early operative interference should be made, it is intracranial complications of middle-ear disease.

THREE FATAL CASES OF OTITIC BRAIN DISEASE.

By J. E. SHEPPARD, M.D., of Brooklyn, N. Y.

DURING the past year the following three cases, which seem to me to present some points of interest, have come under my care:

Case I.—**Acute Middle-Ear Suppuration—Mastoiditis—Lepto-Meningitis—Operation—Death—No Autopsy.**

Morgan L., carpenter, aged thirty-five, born in Wales, was first seen September 23, 1896.

Previous History.—As a result of bathing on July 4th last he had severe pain in the right ear followed after a few days by discharge, which continued about three weeks, and which lessened but did not stop the pain, which again increased, and has now continued with more or less severity for three and a half months, accompanied throughout by a pulsating tinnitus, at first very loud, but latterly not so troublesome. During the past week he has felt weak, has vomited two or three times, and staggers when walking. During this long period he has been under the care of two or three physicians, none of whom has recommended operation.

Present Condition.—Severe pain, which is pretty constant, and extends from the right ear to the vertex; the patient is evidently weak, and walks with a rather unsteady gate; pulse 92, with an average of one intermission in every 20 beats; temp. 98.4°; mastoid and side of head absolutely free from tenderness or other evidence of trouble; the posterior superior canal wall near the membrane is distinctly bulged; no pus in the canal; membrana tympani opaque, not perforated, not reddened, but has a slightly pushed-out appearance of the posterior half. Hearing for the watch $\frac{0}{60}$. Tuning-fork, C″, heard louder from the vertex in the affected ear, with which it is also heard both louder and longer by bone- than by air-conduction. The diagnosis was at once made of mastoiditis, and some intracranial involvement was strongly suspected. To determine the correctness of this suspicion he was recommended to enter the Brooklyn Eye and Ear Hospital for observation, which he did. During the following twenty-four hours, up to 4 P.M., September 24th, the pulse ranged from 70 to 80; temp. 98.2° to 98.6°; eye-grounds examined and pronounced normal; the only symptom of which he complained was pain from the ear to the vertex, and this was less severe than yesterday. During the evening the pain seemed to increase, and by midnight he was somewhat delirious, with a temperature of 100.4°.

September 25th, 8.30 A.M.—Temp. 102.4°; delirious, but can be aroused to answer an occasional question; pain evidently severe; some photophobia. A diagnosis of meningitis was made in conjunction with Dr. A. C. Brush.

In view of the successes reported at the 1896 meeting of the American Otological Society from early operation in otitic meningitis, it was felt that operation was strongly indicated, even though the prognosis was grave. The mastoid cavity was first opened, and in it was found a considerable quantity of pus and granulation tissue. While curetting this out, owing to a softened internal table, the lateral sinus was opened with resulting free hemorrhage, showing the sinus to be clear. The mastoid antrum was opened, but no communication with the cranial cavity could be found. A trephine opening was then made just above the external auditory canal, when the dura was found to be distinctly inflamed, moderately bulging, but not pulsating. On opening through it the brain bulged somewhat, but seemed of fairly normal color and consistency. With the exploring needle investigation was made in several directions without finding any collection of pus. The operation, which lasted less than an hour, was well borne by the patient. During the following thirty-six hours there were several more or less general convulsions.

September 26th.—Patient semi-comatose all day; pulse 110 to 130; temp. 100° to 102°; took nourishment; passed no urine until twenty-four hours after the operation, and this upon examination was found to contain considerable albumen and a moderate amount of sugar. Late in the evening the patient seemed to be dying, but through vigorous hypodermic stimulation with strychnia and whiskey by the house surgeon, Dr. Van Dyck, he rallied, and on September 27th seemed much better, conversing with some ease, and answering questions intelligently, showing a markedly improved mental condition; temp. A.M. 99.4°; pulse rapid and at times of poor quality; passed urine frequently; marked constipation.

September 28th failed all day; evident lack of muscular power; pupils dilated; pulse rapid and weak; died at 11 P.M. Unfortunately an autopsy was not allowed.

Remarks.—In the first place, during the two and a half months the patient was under treatment before I saw him, it would seem as if there must have been symptoms demanding that the mastoid cells be opened, and the patient's death seems to me directly attributable to the unwarranted abstention from operation at that time.

In the second place, when the patient first visited me, although the symptoms were very indefinite, I believe that I was warranted in my conclusion that there was some intracranial involvement, and was warranted further in waiting for one or two days to observe the patient, and obtain, if possible, a clue as to the nature of his brain trouble. The thirty-six hours' delay at that time did not in my judgment contribute to his death.

In the third place, in the light of experience gained then and subsequently, I believe I should, in spite of the meningitis found at the first opening of the skull, have investigated further into the condition of the posterior fossa, particularly with the view of finding whether or not a cerebellar abscess existed.

A further question, suggested to me by some who saw the case, is as to the share the kidney condition may have had in his death. This question arises from the presence of albumen in his urine, and from the improved mental condition the day before his death, suggesting a subsidence of the meningeal inflammation. This question seems to me a difficult one to answer, though my own judgment is that the cause of death was the meningitis due to the mastoid cells not having been operated earlier in the course of the disease.

CASE 2.—Chronic Middle-Ear Suppuration—Mastoiditis—Epidural Abscess—Meningitis—Operation—Death—No Autopsy.

Henry C., aged seven years, came to my office January 6, 1897.

Previous History.—The mother says that the boy has always been delicate; that his right ear commenced discharging during dentition; that this was worse after scarlatina when he was three years old; that when he was four years old he was under my care for some time at the Brooklyn Eye and Ear Hospital, when I treated him for chronic middle-ear suppuration (as shown by the records); that since then there has been occasionally a small amount of pus in the ear. This attack dates back one week, according to the mother's account, when he commenced to have pain in the right ear with increased discharge, the pain remaining in the ear until yesterday, when he complained of headache in both the frontal and occipital regions; three days ago, and again this morning, he vomited; has seemed drowsy, but sleep is restless; two or three times there has been slight delirium; has had "high fever," but no chills.

Present Condition.—Pulse rapid and weak; temp. 100°; head drawn markedly and rigidly backward; pupils slightly enlarged, sluggishly responsive to light; eye-grounds, as reported upon by Dr. Simmons, about normal; patient says bright light hurts his eyes; no external evidences of mastoid trouble, but the mastoid is markedly tender; auricle normal; external auditory canal filled with very offensive pus containing one or two cholesteatomatous masses, and the posterior wall markedly bulged; the membrana tympani perforated in the posterior inferior quadrant, the perforation being partly blocked by cholesteatomatous matter; attic region much bulged.

In this case it seemed to me so clear that a general meningitis existed that I advised against operation as being useless, telling the parents at the same time that if they and the family physician requested it, I would operate so as to give the child whatever chance such a procedure offered. Dr. J. F. O'Connell saw the child and strongly urged an operation, which was accordingly performed later in the day.

On account of the bulging of the attic region, and in order to drain it, a very carious malleus was removed as the first step, then the mastoid antrum was opened in the usual manner and found to be filled with granulation tissue and cholesteatomatous material, all of which was cleared out; when the first button of bone was removed, excessively offensive pus welled up into the opening; which was found to come from an epidural abscess in the immediate region of the lateral sinus. The parts were carefully cleansed and dressed with iodoform gauze. During the operation both the pulse and respiration became very poor, but responded to hypodermic stimulation.

January 7th.—Slept better last night than for several nights previously; pulse 80 to 110; temp. [per rectum] 101.5° to 102.4°; neck not so much retracted as yesterday, but cries out frequently from the pain in his head, which seems to be frontal; pupils equal but rather large and sluggish.

January 8th.—Pulse 78 to 90; temp. [rectal] 101.2° to 103.°; cries out with pain in head, which seems worse in the right frontal region; had a fairly comfortable night; no vomiting; no muscular twitching; answers questions with apparently full intelligence; wound dressed this morning; no pus present; marked motion of brain with respiration, but apparently none with the pulse; during the afternoon he became partially comatose, the coma increasing during the night, and accompanied by muscular twitching, but no general convulsion.

January 9th.—Died at 11 A.M.

Remarks.—About three months later I learned quite accidentally that the parents of this boy had been strongly urged by their physician to bring him to me five days before they did. At that time there was no retraction of the neck muscles nor other distinct evidence of a general meningitis, so that this death seems attributable to delay on the part of the parents. The case proved to be a favorable one for operation, the epidural abscess being within rather easy access, and experience with other cases gives reasonable ground for thinking that a cure might easily have resulted from earlier operation.

CASE 3.—**Recurrent Middle-Ear Suppuration—Mastoiditis—Epidural Abscess—Meningitis—Two Operations—Death—Autopsy.**

Charles K., aged twenty-two, came to me on account of his final illness May 15, 1897.

Previous History.—My first acquaintance of the case was made in May, 1893, when I treated him for chronic middle-ear suppuration on both sides, and deflection of the nasal septum. At that time there had been frequently recurring suppuration in both ears since infancy, each attack being preceded for two or three days by pain. Both canals were filled with offensive pus. There were large posterior perforations of both membranes and some granulation tissue along the posterior walls of the tympanic cavities. With less than a month's treatment, during which nasal respiration was restored, the ears had ceased discharging.

The patient then left for Europe and was not seen again until November 15, 1896; he said that during this 3½ year's interval nasal respiration had been perfect, and that he had had absolutely no trouble with his ears until a week ago, when he commenced to have slight pain in, and discharge from, the left ear. There was some pus and cholesteatomatous material in the canal. Under treatment the pain and discharge ceased in a week's time, after which he was not again seen until May 15, 1897, when he said he had had no trouble with the ears until one week ago, when the left ear began to feel stopped up and slightly painful, together with considerable pain which he located in the occipital region, and at the same time there was as he expressed it a seeming inability for brain work, difficutly in collecting his thoughts, and especially did he have trouble with his memory. During the past three days the ear has discharged, and the head has felt better.

Present Condition.—Canal contains watery pus, and on using the syringe considerable cholesteatomatous material comes away. The same posterior perforation exists, the opening leading up toward the attic and antrum. The membrane over the attic is quite red and very tender.

May 19th.—When he was next seen, he says that since last visit there has been considerable watery discharge; pain [not severe] in and around the ear; to-day has felt feverish, and by no means well at any time since last visit; sleeps poorly; there is slight but unmistakable tenderness over the region of the antrum; the membrane and surrounding parts are more inflamed than last time, but no retention of pus; this evening temp. 101.1°; pulse 108; patient was ordered to stay away from business.

May 20th.—Feels in a general way better; has a sore feeling and some pain in the ear; tenderness over antrum the same as yesterday, slight but unmistakable; semi-watery discharge; temp. 99.8°; pulse 96.

May 21st.—Temp. 99.8°; pulse 96; other symptoms unchanged.

May 22d.—Temp. 98.4° ; pulse 90 ; other symptoms unchanged.

May 23d.—Temp. 98.4° ; pulse 90 ; the inner end of the canal grows redder, and what looks like beginning drooping of the posterior superior wall.

May 24th.—This drooping has increased ; moderate pain ; tenderness over the antrum has slightly increased ; operation was undertaken in the afternoon. After chiselling through an intensely hard sclerotic bone, a few drops of pus were found near the antrum ; in which to my surprise there was no cholesteatoma ; a necrotic malleus was removed, the incus on account of the free hemorrhage not being found ; applied the usual dressing.

May 25th.—Head feels dull and pretty sore, but is free from pain ; temp. 101.4° ; pulse 80 ; vomited for sixteen hours after the ether.

May 26th.—Temp. 103.4° ; pulse 86, full and hard ; complains of a severe "thumping" pain at the vertex (not over the side of head) ; eyes not sensitive to light.

May 27th.—3 P.M., temp. 103° ; pulse 86 and more natural ; head feels much better, being free from the "thumping" of yesterday, and almost free from pain ; no photophobia.

May 28th.—5 A.M., had a very restless night with much fever ; temp. 104.8° ; pulse 90 ; again has the thumping at the vertex and some pain ; no vomiting ; no photophobia ; wound dressed ; looks clean and healthy. 4.30 P.M., temp. 103.9° ; pulse 94 ; no headache, and no thumping.

May 29th.—6.30 A.M., temp. 104.6° ; pulse 110 ; no pain in head ; no eye symptoms. 12 M., temp. 104.4°. 6.30 P.M., temp. 104° ; pulse 90 ; has had a fairly comfortable day, without headache. At 10 P.M. I was called, and found him actively delirious, but this soon passed away. 11 P.M., temp. 103.4° ; pulse 110.

May 30th.—3 A.M., temp. 101.4°. 10 A.M., 104.4° ; pulse 120. Pupils active ; moderate headache. 3 P.M., temp. 104.4° ; pulse 128 ; no headache ; mind fairly clear. At this time he was seen in consultation by Drs. H. Knapp, of New York, and Wunderlich, of Brooklyn. The eye-grounds were examined and found to be normal. The opinion was that the condition was probably due to an epidural abscess with commencing meningitis, and the recommendation was that, unless there were improvement in twenty-four or forty-eight hours, an exploratory opening of the cranial cavity should be made.

May 31st.—8.30 A.M., temp. 103.2°; pulse 120; mind fairly clear; no headache; slept fairly well last night and to-day. 12 M., temp. 104.° 6 P.M., temp. 103.4°; pulse 116; no headache.

June 1st.—8 A.M., temp. 103.9°; pulse 116; somewhat delirious through the night, but his attention is easily attracted so that he can talk rationally; no headache; says the light hurts his eyes a little. 12 M., temp. 104.6°. During the morning, the temperature having risen, the pulse ranging from 120 to 130, and respiration having become rapid and irregular, it was decided, with the approval of Dr. Wunderlich, to operate as recommended by Dr. Knapp. At 4 P.M., Drs. Wunderlich, Alderton, and Simmons assisting, the cranial cavity was opened just above the external auditory canal, the gouge and rongeur being used; no pus was found; the dura was distinctly inflamed; the portion of bone overlying the tympanic cavity was investigated, and no bare bone or pus found; the aspirator was then used in several directions into the brain substance, but with a purely negative result; another opening was made posteriorly for investigation of the posterior fossa and cerebellum, but nothing was found save an inflamed dura. After the operation, pulse 150 to 160; temp. 102.6°; 10 P.M., pulse 158; temp. 103.8°; partially conscious.

June 2d.—8 A.M., condition through the night and this morning not much changed, except that the patient is evidently weaker. Died at 12 M. During yesterday and to-day, at frequent intervals, there was right-sided internal strabismus. No convulsion except a partial one lasting but a moment while under ether yesterday. Just before the last operation the eye-grounds were again examined by Dr. Simmons and pronounced normal.

Autopsy, June 3d, by Dr. J. M. Van Cott, the head only being examined. Found lepto-meningitis of both base and convexity, that of the base being more on the left side. All sinuses free from clot. *At the apex of the petrous portion of the temporal bone there was an epidural abscess in the immediate region of the foramen lacerum medium,* which had extended toward the median line so as to involve the pituitary body. The bone was much softened about this region, the softening involving the walls of the carotid canal, so that, although the bone could not be removed for further examination, the inference seems to be almost beyond question that the infection extended inward from the tympanic cavity along the carotid canal, the abscess having its centre at the point where that canal enters the cranial cavity.

Remarks.—Cure by operation of an epidural abscess in this region, so near the centre of the head, seems to me to be beyond the power of our present resources.

Prevention, it seems to me, might have been a possibility by removing the remains of the membrana tympani and the two larger ossicles when the case was under treatment previous to his last illness, *e. g.*, when in 1893 he first came for treatment with the history of recurring discharge the greater part of his life. This, however, would have been contrary to the established rules of treatment, which require in such suppurative cases a preliminary course of treatment by simpler measures, which so often, as in this case, result in cessation of discharge and apparent cure. A relatively short course of treatment resulted in stopping all symptoms referable to the ear for three and a half years, when a slight recurrence again yielded to three treatments, to be followed six months later by the fatal recurrence. The fact remains that the more radical treatment of the case when first seen might have been the means of averting the final fatal attack, and, to my mind, opens the question for our serious consideration, whether it would not be wiser treatment in all long-standing cases to remove whatever membrane remains, together with the larger ossicles, especially since this method, as a rule, rather helps than impairs the functional usefulness of the organ.

THE CENTRAL ACOUSTIC TRACT AND ITS INVOLVEMENT BY TUMORS OF THE MID-BRAIN, ESPECIALLY OF THE CORPORA QUADRIGEMINA AND THE TEGMENTUM.

By Prof. F. SIEBENMANN, Bâle.

Translated by Dr. Arnold H. Knapp, New York.

(With seven illustrations.)

I.—INTRODUCTION.

According to the classification of Nothnagel[1] and Bernhardt,[2] and to the publications which have hitherto appeared, disturbance of hearing occurs in tumors of each of the five parts of the brain: the medulla oblongata (after-brain); the cerebellum and pons (hind-brain); the corpora quadrigemina and crura cerebri (mid-brain); the optic thalami (inter-brain); and certain regions in the cerebral hemispheres (fore-brain).

The most frequently observed, and therefore the better known, are the disturbances of hearing in affections of the cerebellar hemispheres and the pons; in these cases the acoustic tract itself is directly involved by the tumor, and the deafness is generally on the same side as the tumor. Crossed deafness occurs more rarely, and is due to a lesion in the regions of the cerebrum surrounding the Sylvian fossa.

Up to within a few years, deafness has been but little noted in affections of the thalamencephalon and the mesencephalon. Nothnagel does not mention it in the part on diagnosis of affections of the corpora quadrigemina, although in two of his collected cases disturbance of hearing is mentioned. In one of these (Gowers[3]), the impairment of hearing occurred during the period of observation, and Gowers refers the impairment to a lesion of the crossed tegmental region found at autopsy. In the other (Duffin[4]), the connection between the brain tumor and the deafness remains unexplained, owing to insufficient observation. In his last publications, Nothnagel[5,6] considers the atactic gait, and the external, asymmetrical ophthalmoplegia as alone of pathognomonic value among the symptoms of disease of the corpora quadrigemina, and regards all other appearances as complications or of secondary value.

Among fourteen cases of tumor of the corpora quadrigemina (including the pineal body) collected by Bernhardt,[7] there were four cases with deafness. Based on these observations, Hartmann says, in his text-book on *Diseases of the Ear*, fourth edition, 1889, page 244: "In the region of the intersection of the crura cerebri, in the region of the corpora quadrigemina, are situated the nuclei of the third and fifth nerves; therefore, when these areas are affected, deafness occurs in conjunction with strabismus and diplopia, with xerosis of the cornea, with trigeminal neuralgia, and paralysis of the muscles of mastication." The author continues with justice: "Unfortunately, up to the present time, disturbance of hearing has received too little attention at the hands of the neuropathologists, and from the examinations of the above cases we can draw but few conclusions." In 1894, A. Schrader,[8] at the suggestion of Hitzig, collected fourteen cases of affections of the crura cerebri (apoplexies, softenings, tubercles, gliomas, gliosarcomas); in only one of these (Mohr), where the tubercular process had extended into the substance of the corpora quadrigemina and the optic thalami, deafness was noted. From this small number of observations, it seems that affections of the crura cerebri alone do not involve the function of the central auditory tract, a supposition which has been confirmed by all of the more recent clinical investigations: Leube,[9] Raymond et Artaud,[10] D'Astros,[11] and others.

A. Christ,[12] in 1890, added to our knowledge of this subject by the publication of a case of sarcoma of the corpora quadrigemina, together with a grouping of thirty similar cases. This patient became deaf during his stay in the hospital. Through the kindness of Professor Immermann, I had repeated opportunity for examination, and I was enabled to obtain both temporal bones after death in a fresh condition. It was this unusual opportunity which led me to study this subject. Christ found deafness noted eleven times in the thirty cases. As after death the region of the primary nuclei and acoustic tracts were found entirely normal, this author is inclined to agree with the conclusions which Steinbrügge arrives at, after the recent examination of a similar case where deafness was supposed to be due to increased perilymphatic pressure in the labyrinth. On the other hand, Weinland, in *Archif für Psychiatrie*, vol. xxvi., endeavors to show that *deafness in tumors of the corpora quadrigemina is due to a direct involvement of the central acoustic tract.* This author,[14] in a case of monolateral tumor of the corpora quadrigemina where progressive deafness was found in the opposite ear (a thorough functional examination, however, was not made), examined the base of the brain in serial sections, and found, beside other changes, a degeneration of the lateral fillet, and the brachium of the posterior corpus quadrigeminum. This observation, and a study of seventeen cases collected from the literature, leads him to the conclusion: "Affection of a posterior corpus quadrigeminum causes deafness in the crossed side." He attempts to explain the fact that in half of the cases no deafness was found by two suppositions: either that the tumor did not involve the lateral part of the corpora quadrigemina under which the lateral fillet passes, or that there is an error in observation. Thus Weinland's views are directly opposed to those of Nothnagel and also to Lichtheim,[15] who thinks that only ocular paralyses and disturbance of equilibrium are of diagnostic value in tumor of the corpora quadrigemina, and that the deafness observed by some authors is due to indirect symptoms or to accompanying disease.

The most recent papers on tumors of the corpora quadrigemina are in accord with the views of Weinland. Frankl-

Hochwart,[16] in the cerebral disease of the acoustic nerve, states that deafness is well known in affections of the corpora quadrigemina, and he even speaks of quadrigeminal deafness. Oppenheim,[17] page 122, says: "It can no longer be doubted that deafness is a focal symptom in tumors of the corpora quadrigemina."

I have endeavored to enlarge and complete the study of the cases collected by Weinland and have brought the same up to the beginning of 1896. My results are not ambiguous and confirm the opinion of Nothnagel and Lichtheim to the extent that destruction of the lamina quadrigemina alone causes no deafness, and that to interrupt the central acoustic tract a lesion is necessary in the parts situated more ventrally in that region, especially in the lateral tegmentum, including the brachia of the post. corpora quadrigemina.

2.—TOPOGRAPHICAL ANATOMY OF THE MID-BRAIN.

The mid-brain can be described as that part of the base between the third and fourth ventricles which contains the Sylvian aqueduct. It is composed of two parts: the quadrigeminal and that of the crura cerebri. Each crus consists of a pes or crusta and a tegmentum. The tegmental part of the pons is the direct caudal continuation of the tegmental part of the crura and is situated between the dorsal layer of true fibres of the pons and the floor of the fourth ventricle. A transverse plane through the entire canal of the Sylvian aqueduct (see Plate I), divides the dorsally situated quadrigeminal plate (the quadrigeminal elevation of Bechterew), from the so-called tegmental region. On the ventral side of the base of the brain, in the region of the anterior corpora quadrigemina, are situated the crura cerebri (see Fig. 4); in the post. part of the quadrigeminal plate the proximal end of the

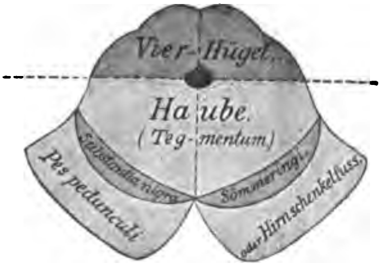

FIG. I.

Diagrammatic section through the mid-brain at level of ant. corpora quadrigemina.

pons appears (Figs. 2 and 3). The quadrigeminal plate and tegmentum appear in almost all of the cross-sections of the mid-brain; in the posterior sections through the post. quadrigeminal bodies the pons appears, while in all of the sections through the ant. bodies the crusta is seen on the ventral surface. The brachia of the corpora quadrigemina are situated principally below the quadrigeminal plate in the lateral region of the tegmentum; the posterior one, which runs toward the corpus geniculatum mediale, contains in addition a portion of the central auditory tract. The pineal body, or conarium, arises in the post. commissure of the third ventricle and rests upon the anterior quadrigeminal bodies. Phylogenetically it must be considered as the atrophied parietal eye. This structure is unusually prone to tumor formation, partly benign, partly malignant in nature, which either compresses or passes directly into the corpora quadrigemina. The quadrigeminal region (see Fig. 6) is covered posterially by the culmen of the cerebellum, anteriorly by the splenium, the lower and median surface of the cerebral hemispheres, by the gyrus fornicatus at its junction (isthmus) with the occipital and temporal lobes and by a small part of the latter two lobes, (see Figs. 5 and 6). In all of these structures surrounding the corpora quadrigemina tumors have been observed and described which have either led to disease of the corpora quadrigemina or reversely have originated in the corpora quadrigemina.

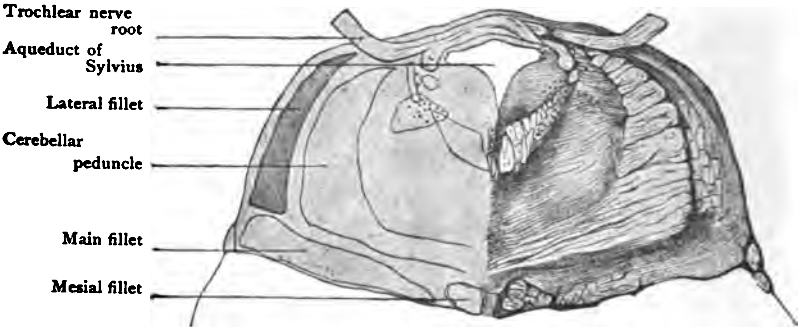

FIG. 2.

Section through posterior part of mid-brain after Obersteiner.

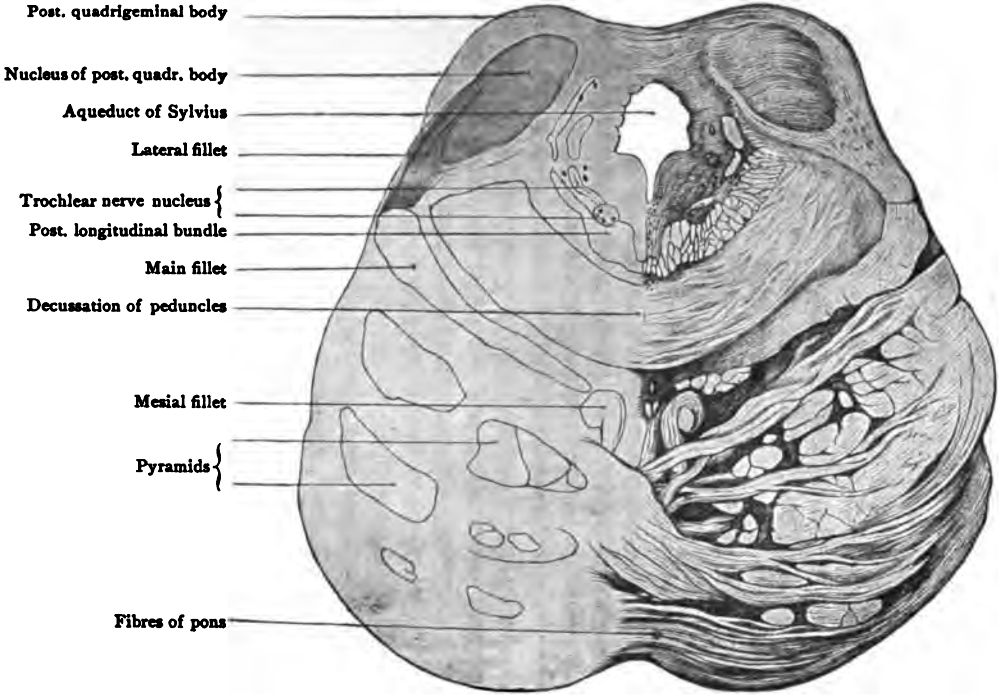

FIG. 3.
Section through the post. corpora quadrigemina (Obersteiner).

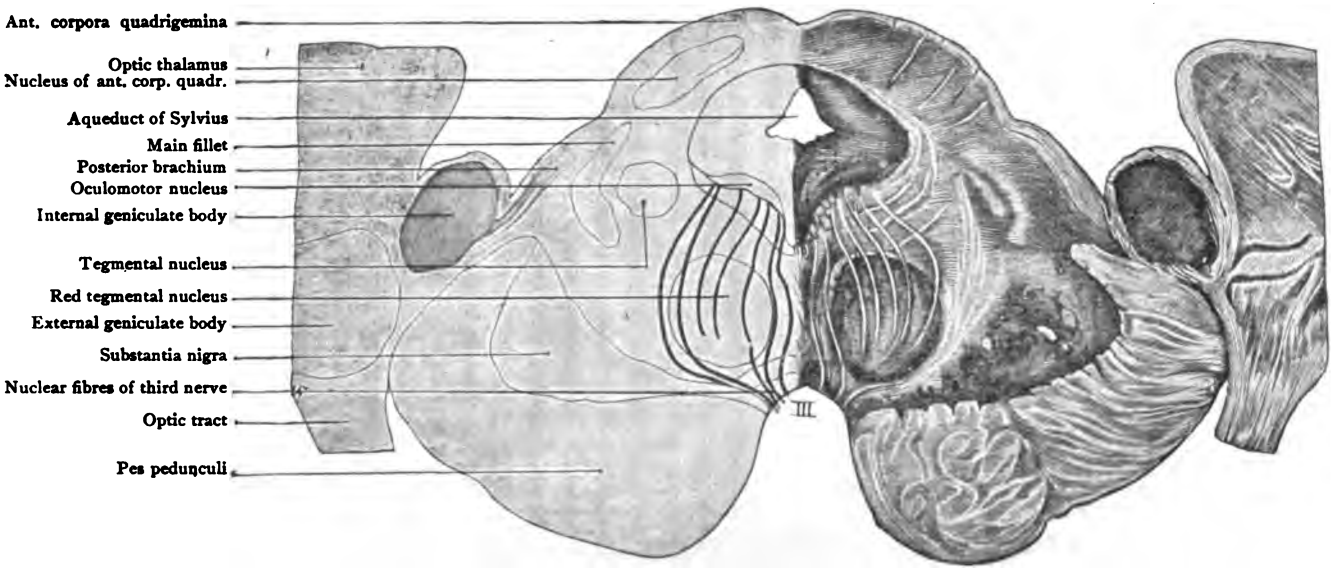

FIG. 4.

Section at level of ant. corpora quadrigemina (Obersteiner).

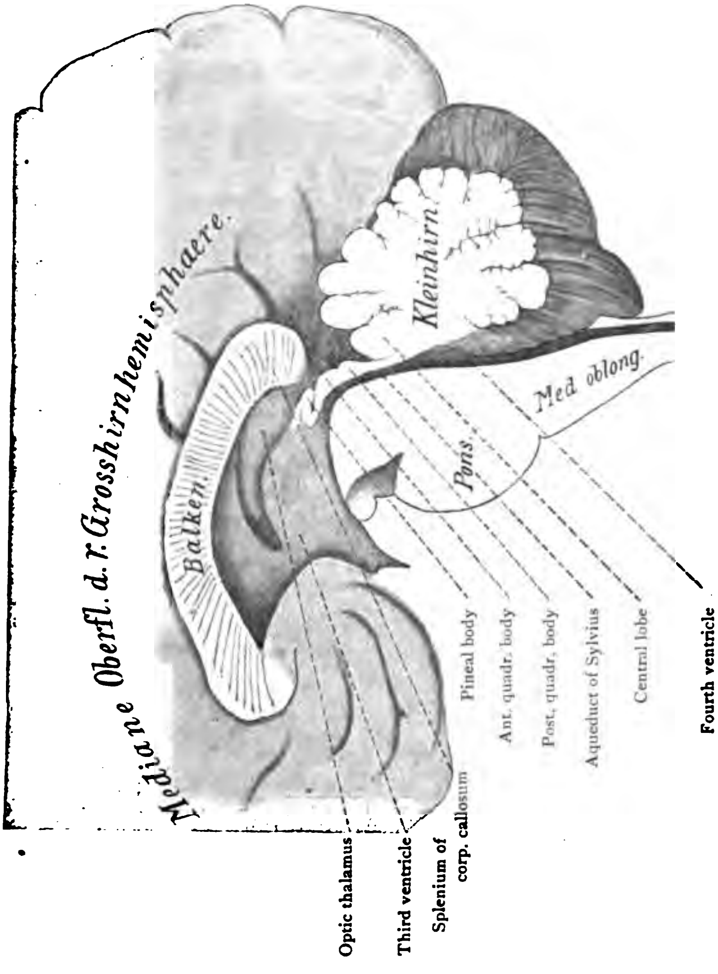

FIG. 5.

Median section through the brain.

Of the fibres and the ganglia of the mid-brain which are of especial interest to us, we may mention the fillet, the nuclei of the third and fourth nerves and of the corpora quadrigemina, as well as the peduncles and the pyramidal tracts which travel in the crura cerebri and in between the fibres of the pons. The arrangement of the fibres in the fillet can be seen at the level of the trochlear nerve nucleus to consist of three separate bundles which all travel in the cortical zone of the field. A lateral part, the lateral fillet, forms the exteral limit; the main fillet (Bechterew) and the mesial fillet (nearer to the middle line) are situated dorsally. All three divisions are bounded internally by the superior peduncle of the cerebellum. The nuclei and roots of the fourth nerve are situated at the side and in the roof of the Sylvian aqueduct. At the level of the posterior corpora quadrigemina (Fig. 3), the fibres of the lateral fillet appear to approach and to enter the nucleus of the corpora quadrigemina. The two largest bundles of fibres of the peduncles coming from the cerebellum decussate in the middle line. The anterior nuclei of the fourth nerve are

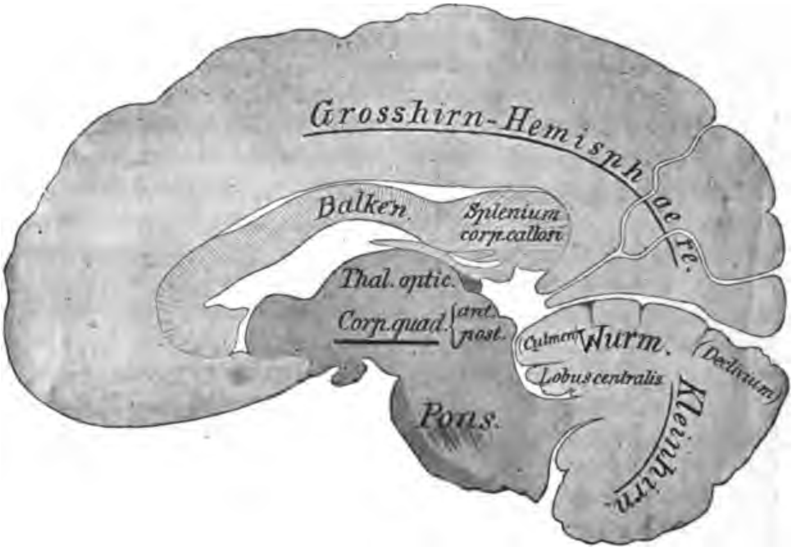

FIG. 6.

Sagittal section (2-3 *mm* from the middle plane), from Déjerine.

situated to one side of and in the floor of the Sylvian aqueduct, and adjoin the posterior longitudinal bundle (fasciculus longitud. post.). A transverse section through the ant. corpora quadrigemina (Fig. 4) shows the crura cerebri, the brachia of the post. corpora quadrigemina and their continuation to the corpus geniculatum internum and to the nucleus of the anterior corpora quadrigemina, the nuclei and nuclear fibres of the third nerve, the red tegmental nucleus, the posterior part of the optic thalamus, as well as the corpus geniculatum externum with the nuclear fibres of the optic nerve.

Of these tracts, the large sensory, nucleated tract of the fillet is of the greatest importance to the otologist. Its relations to the auditory nerve, to the quadrigeminal bodies, to the corpus trapezoides, and to the upper olive have chiefly been investigated by Roller[18, 19]. The main portion, the upper fillet, which Bechterew recently named the main fillet (*Arch. f. Anat. und Physiol.* anat. Abthlg., Heft 4–6, 1895), extends through the entire base of the brain to the optic thalamus, in small part also directly to the cerebral cortex. It presents in general the central continuation of the posterior columns of the cord. The motor tracts (facial,

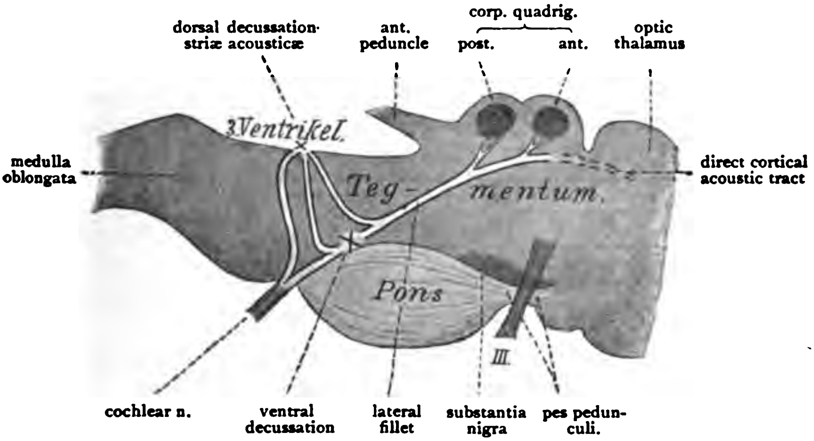

FIG. 7.

Central acoustic tract (diagrammatic).

hypoglossal) are situated in the mesial fillet. The central acoustic tract runs in the lateral or lower fillet, which extends from the level of the upper olive to the quadrigeminal nuclei, sending a few fibres direct to the frontal cortex (Held).

The primary acoustic centres in the brain have long been known. Our knowledge of the central acoustic tract has greatly advanced during the last ten years by the combination of various new methods of research: the methods of Golgi, Weigert, and Pal; the examination in the various developmental stages (Bechterew); especially, however, by Gudden's method.

The central course of the vestibular nerve is even to-day but little understood. The course of the cochlear nerve is much better known, mainly through the investigations of Roller,[18, 19] Flechsig,[20, 22] v. Bechterew,[23, 26] Monakow,[29, 31] Forel-Onufrowicz,[27] Bumm,[33] Baginsky,[28] Kirilzew,[32] Oseretzowsky,[34] Cramer,[35] and, finally, by Held,[36] Kölliker,[37] and Bechterew.[38]

The primary central stations of the cochlear nerve are situated on both sides in the posterior part of the pons. Each is composed of two, not sharply-separated, collections of ganglionic cells, the one, dorsal (the acoustic tubercle), and one, ventral, the anterior or accessory acoustic nucleus. *The acoustic tracts extend from these primary auditory centres; in the tegmentum most of the fibres decussate upwards to the lateral ventral part of the quadrigeminal region, and then pass through the brachia and the internal geniculate bodies beneath the posterior part of the optic thalamus to the internal capsule, and finally reach the cortex of the temporal lobe.* The course of the fibres is not uncomplicated, and is difficult to study, because all fibres do not travel the same path, but separate, and later unite again to a large extent. The tracts and their branches travel crossed, and others uncrossed, and the semi-decussation may take place at entirely different places, as dorsally in the acoustic striæ, ventrally in the trapezoid body. Even to a greater extent than in the other central tracts does the acoustic tract split up into a number of neurones, *i. e.*, the fibres are interrupted for distances by the introduction of large ganglionic masses, and these send out beside the cortical tract a number of reflex tracts.

Held[36] distinguishes in this way three systems: System I. is that collection of fibres which pass from the cochlea directly and without interruption partly to the anterior acoustic nucleus, partly to the tuberculum acusticum; a small part continues to the upper olive, trapezoid nucleus, the nucleus of the lateral fillet, and even more centrally. System II. comprises the greater portion of the central auditory tract. According to Held, it commences in the primary terminal stations of the System I., and passes to the posterior corpora quadrigemina. The greater part decussates, a smaller part continues on the same side. In this path from the primary centres to the quadrigemina, additional fibres arrive from the upper olive, the trapezoid nuclei, and the nucleus of the lateral fillet (corpus parageminum, Bechterew), and also, at successive stages, certain fibres from the primary centres cease. Centrifugal fibres, so-called retrograde System III., follow the same tract with the Systems I. and II.

The greater part of the lateral fillet terminates in the posterior, another part in the anterior, corpus quadrigeminum, by becoming lost in the ganglionic mass, either directly or after decussation (dorsally and ventrally to the Sylvian aqueduct). A small part only of the centripetal fibres passes directly upwards and generally through the lower corpus quadrigeminum to the corresponding brachium, and, further, through the regio subthalamica to the posterior part of the internal capsule, and, finally, to the cortex of the temporal lobe (a smaller portion, which Held also considers a cortical tract, reaches the brachium on the median side). This cortical acoustic tract, especially the part from the posterior brachium, is joined by a system of fibres whose axis-cylinders arise from the posterior corpora quadrigemina.

In addition to this small cortical tract the quadrigeminal region contains a large system of reflex acoustic tracts which are in close connection with the quadrigeminal nuclei. Optic fibres terminate in the large ganglia of the superficial portion of the anterior quadrigemina (Ramon y Cajal, Van

Gehuchten); in the middle and deeper gray of the anterior, corpus quadrigeminum are situated the terminative of the fibres of the lower fillet, as well as the origin of the fibres which Held regards as reflex tracts. The fibres pass in the direction of the surfaces of the quadrigemina to the above mentioned ganglia and thus connect with the optic nerve; others descend in the lateral tracts, inclining to the medulla after they have sent collateral branches to the third-,fourth-, and fifth-nerve nuclei (posterior longitudinal bundle). Additional reflex paths pass from the trapezoid nucleus to the seventh-nerve and sixth-nerve nuclei of the same side. We may omit these secondary acoustic centres in the trapezoid body, in the upper olive, and the nucleus of the mesial fillet, as they belong to the region of the pons, and consequently not in the scope of this paper.

To return to the consideration of the fibres and nuclei which are in relation to the central acoustic tract in the midbrain and which would be involved in a lesion of the latter, we find dorsally the mesial fillet which is in connection with the posterior spinal columns, and is one of the most important sensory tracts; in it pass (Flechsig, Bechterew) the cortical tracts of the non-motor cranial nerves. The cerebellar peduncles are situated more dorsally and medially (Figs. 2 and 3), which anteriorly continue in the red nucleus (Fig. 4) and complete the connection of the cerebellum with the cerebral cortex; its injury at the level of the red nucleus (Starr[68], Barth[69], Kolisch[70], Scarpatetti[71], etc.) and of the peduncular decussation (Eisenlohr[67]), produces cerebellar ataxia. The posterior longitudinal bundle (Fig. 3) is situated more anteriorly and nearer the middle line, though still within the tegmental area. This is probably a sensory-motor reflex tract, and connects, as above stated, the nuclei of the third, sixth, fourth, (and fifth?) nerves, and also is closely related posteriorly to the anterior and lateral tracts of the cord, and to the gray matter of the pons. The fibres of the nucleus tegmenti (see Fig. 4) originate in the latter. Held (*l.c.*, 265) thinks that there is a reflex centre of the auditory nerve for respiratory movements and vascular innervation in this area. At the upper limit of the tegmentum, below the anterior quadrigeminal bodies, the three nuclear groups of the third nerve are situated in the floor and sides of the gray matter surrounding the aqueduct; the nuclear fibres of this nerve are situated ventrally to this and run in the crural tegmentum through its entire extent.

The decussated nuclear fibres of the fourth pair are situated in the roof of the aqueduct, below and posterior to the posterior quadrigeminal bodies (Figs. 2 and 3), while the floor and the lateral walls contain the nuclei.

If tumors in the anterior quadrigemina extend to the contiguous posterior end of the optic thalamus and down toward the anterior end of the crura, both the geniculate bodies and the optic tract become affected. We have intimated above that the destruction of the internal geniculate body causes a disturbance in the auditory function. The physiological importance of the external geniculate body as a primary centre of the optic nerve is acknowledged. Rarely are the crura directly injured by tumors starting in the quadrigeminal region, as death occurs before the tumor extends far in depth; it is more frequent to observe an extension (tubercular tumors) in the opposite direction from the ventral to the dorsal surface of the mid-brain (Mohr[8], and Paquet, *Bulletin de la Soc. Ant.*, 1864). It is unlikely that the symptoms of motor and sensory irritation in the extremities which are frequently caused by tumors in the quadrigeminal region are the result of direct injury of the pyramidal tracts, because these symptoms may all be caused reflexly from the tegmentum, as has been proved by the experiments of Ziehen."[9] The mesial fillet passes in the proximal part of the pons through the dorsal-median part of the tegmentum, and farther above approaches the crura cerebri. According to Bechterew, this tract contains the cortico-bulbar bundle of the facial and hypoglossal nerves; its injury is not uncommon.

3.—EMBRYOLOGY, COMPARATIVE ANATOMY, AND EXPERIMENTAL PHYSIOLOGY OF THE QUADRIGEMINAL AREA.

The function of the quadrigeminal region is much less understood than the morphology. The results of animal experimentation cannot be applied directly to man, because the quadrigemina in man are less developed, and consequently are of less importance. Longet[4] has made the most extensive comparative-anatomical investigations, and measurements on the subject, and says, p. 460: "l'homme est de tous les animaux vertebrés celui qui présente les tubercules quadr. à leur minimum de développement." In the early embryonal periods the mid-brain is formed by a rather wide space of the medullary tube (whose position at the end of the first month corresponds to the cervical flexure). It then remains backward in the further development, and in the fourth to fifth month is covered over dorsally by the cerebral hemispheres and the cerebellum. Phylogenesis teaches us that in the lower vertebrates, even in later life, conditions exist which are similar to those of the higher vertebrates in the embryonal state. In these the mid-brain occupies a much greater part of the brain than in mammals, and, in man, *the ganglionic mass of the quadrigeminal plate appears as a relatively dwarfted organ.* The lower we descend in vertebrates, the larger space do the quadrigemina occupy. In the reptiles, they are larger than the cerebellum; in birds, they form a pair of lobes (lobi optici), which are even larger than in the reptiles. Finally, in fishes, especially in bony fish, they form the largest part of the brain. Solid, *i. e.*, without ventricular extension of the aqueduct, are only the quadrigemina of the mammals.

It is an important fact that in the lower animals this enlargement is only in the anterior quadrigeminal bodies, while the posterior pair are contracted to a scarcely visible ganglion in the back part of the lobus opticus. In the mammals, the posterior quadrigemina increase to the size of an independent structure, and almost equal the anterior pair. *This increase in size of the posterior corpora quadrigemina in animals remains of equal degree symmetrically commensurate to the development of the auditory organ.* Spitzka[77] found that the length of the cochlear canal was proportional to the volume of the posterior quadrigemina. As regards animal experimentation, Serres[88] found with Rolando that injury of the lobi optici in the three lower classes of vertebrates was regularly followed by diminution of vision and reflex dilatation of pupil on the opposite side. In agreement with the results of experiments on mammals, Serres found in man (four cases with autopsy) never any changes in vision, but regularly disturbance of co-ordination, epileptic attacks, choreic conditions, and in one case also aphasia and anomaly of the third nerve (interior and external muscles). There is no mention of any loss of hearing. Desmoulin[39] arrived at similar results to Serres, except that in the frog representing the amphibia, blindness occurs on the operated side. Flourens[40] and Longet[41] also believe to have found, contrary to Seroso, that the quadrigemina are surely an optic centre in the vertebrates. The latter cites the clinical and pathological observations of Gall, Vrolik, Magendie, Lélul, and Jobert. Flourens and Longet found that stimulation of a corpus quadrigeminum caused contraction of both pupils. Longet concludes with the remark that the function of the quadrigemina was not completely known, and we must wait for new physiological experiments and examination of pathological cases. Recent investigators (Adamück,[42] Schiff,[67] Beaunis, Hensen and Völkers,[68] and Ferrier[69]) have not had more success with their experiments, a fact which is readily explainable by the proximity of the third- and fourth-nerve nuclei, the optic centres, and the posterior longitudinal bundle. The experiments of Ferrier have shown the existence of a centre for the co-ordination of eye movements in this region. Bechterew ("Ueber die Fünction der Vierhügel," *Pflüger's Archiv*, Bd. xxxiii.) observed hemianopsia after removal of anterior quadrigemina; after destruction of the posterior, the disturbance of sight is a more complicated one. The conclusions of the above-named French authors in regard to the disturbance of equilibrium after removal of the quadrigeminal bodies were confirmed by Goltz (for the frog), Kendrick and Ferrier (for birds and rabbits), Traube and Mengarini (for fishes). J. Ott[72] has recently published an experimental proof (in rabbits) for a thermic centre in the quadrigeminal region. Ziehen[73] showed that mechanical irritation of the tegmentum at the level of the anterior quadrigemina causes movements of running; at the level of the posterior, continuous tonic convulsions of the extremities and the trunk,—epileptic attacks without involvement of the brain cortex.

It is noticeable that not one of these experimental physiologists makes any mention of the slightest diminution of hearing. Within the last decade a change has taken place in these observations, chiefly through the efforts of neuropathologists who had found that the quadrigemina, especially the posterior one, were included in the acoustic tract. Bechterew has made important investigations in this line[23] in guinea-pigs and white rats where the corpora quadrigemina are uncovered and accessible. Complete deafness was produced by the destruction of both posterior quadrigemina; in addition, a helplessness of motion, forced positions and movements, a loss of voice in deep destruction, in superficial only weakness and lack of timbre. On electrical stimulation, crying was produced (which has previously been observed by Goltz and Ferrier), lateral deviation of the eyes, turning and elevation of the opposed auricle. It must, however, be distinctly understood that these results cannot be directly applied to man. Large and important centres in animals change to unimportant reflex centres in more highly developed organisms. Some of the functions which in the lower mammals fall to the quadrigeminal bodies can and must belong to the cerebral sphere in man. In these experiments also the possibility of injury or irritation of neighboring deeper structures is very great.

4.—STATISTICAL CONTRIBUTION TO THE PATHOLOGY AND SYMPTOMATOLOGY OF TUMORS OF THE QUADRIGEMINAL REGION IN GENERAL (58 cases). (Abridged translation).

We have selected only those cases which were uncomplicated according to Nothnagel,[1] and in our collection have completed his classification up to March, 1896. We thus were able to collect fifty-eight cases (for list and table of symptoms see German Edition, vol. xxix., part 1, p. 47); forty-eight tumors of the quadrigeminal region with or without involvement of pineal gland, and ten tumors of the pineal gland alone.

The anatomical examination gave:

1. Glio-sarcoma and sarcoma	17	cases.	29.3 %
2. Tubercle	17	"	29.3 %
3. Glioma	11	"	19 %
4. Carcinoma	3	"	5.2 %
5. Cystoid degeneration	3	"	5.2 %
6. Psammoma	1	"	1.7 %
7. Gumma	1	"	1.7 %
8. Lipoma (?)	1	"	1.7 %
9. Teratoma	1	"	1.7 %
10. Uncertain	3	"	5.2 %
	58		100 %

In regard to the frequency, the glio-sarcoma, including the sarcoma, and the tubercle are the most frequent (each 29.3 %). The gliomas occurred less frequently, and rarest were carcinoma, cystoid degeneration, psammoma, gumma, lipoma, and teratoma. This distribution agrees in general with that found by Starr[illegible] in a collection of six hundred tumors of the brain. A study of the age has elicited the following important diagnostic point: in the presence of symptoms of a lesion of the quadrigeminal region in a child below ten, we must at once suspect a tuberculous tumor; glioma, sarcoma, and glio-sarcoma belong to the exception. The most prominent and constant clinical symptoms of a disease of the corpora quadrigemina are, according to almost all authors, a combination of ***ataxia*** (atactic gait or intention tremor, Bruno, Gowers, Goldscheider) with ***disturbance in the motility of the eye.*** The former symptom occurred in 65.5 %, the latter in 75.9 % of our cases; the two combined, in slightly more than half the cases. Crossed hemiataxia with oculo motor paralysis was present in the case of Krafft-Ebing. The most striking symptom of the third-nerve paralysis was ptosis of the upper eyelid; it was permanent in twenty-one cases, transitory in four. In some cases disturbances of accommodation or slight nystagmus were noticed. The sixth nerve was rarely involved, though occasionally alone affected (pressure on the especially exposed trunk, Gowers). In most cases the paralyses of the ocular muscles were unequally distributed as regards the muscles affected, a point upon which Nothnagel lays great stress in the differential diagnosis. Christ has emphasized the importance of finding bilateral trochlear nerve paralysis. Our cases show that mydriasis is a very rare appearance in tumors of the quadrigeminal region.

Motor disturbances were rather frequent, in 67.2 % of the cases, sensory disturbances were unusually rare, in 17.5 %.

Almost a *constant symptom* in tumors of this region are *changes in the optic nerve*, or its function. Blindness was present in seventeen out of the fifty-eight cases, and diminution in sight in twenty. Ophthalmoscopic changes were present in all of these cases except two, and in ten additional cases where sight was not materially affected. No change in the vision or in the appearance of the disc was noted in only four cases.

The *scanning* mode of speech was an interesting symptom in eighteen of the cases. The change of speech was a slowing, hesitancy, or an indistinctness or finally complete muteness (infracortical motor aphasia, fascicular anarthria) in two cases. When the right crus alone is affected, no dysarthria or anarthria occurs. Our cases seem to confirm the statement that dysarthria and "peduncular aphasia" also occur as symptoms of tumors of the left crural tegmentum, while they are absent in a similar lesion of the right crus.

(*To be continued.*)

I.—A CASE OF CHLOROMA OF BOTH TEMPORAL BONES, OF BOTH LATERAL SINUSES AND OF BOTH ORBITS, SIMULATING AN OTITIC PHLEBITIS OF THE CAVERNOUS SINUS.

II.—THE LITERATURE ON THE CHLOROMA OF THE TEMPORAL BONE AND OF THE EAR.

By Prof. O. KÖRNER, Rostock.

Translated by Dr. Arnold H. Knapp, New York.

THE following case is of great interest in several respects. The occurrence of a chloroma in the temporal bone is not mentioned in the literature of otology, and we have in this case proof that the symptom-complex due to an otitic phlebitis of the cavernous sinus may be caused by another intra-cranial affection.

H. P., six years old, of previous good health, became hard of hearing in August, 1895, and complained of headache, of increasing severity. Both eyeballs became prominent, especially the left one. On admission to the ear clinic the boy was well nourished, though very pale. A double exophthalmus, more marked on the left side, was very noticeable ; in addition, both abducent nerves were paralyzed, the left partially, the right completely. The cutaneous veins of the forehead were distended. Both temporal regions were swollen, but of normal resistance on palpation, and finger pressure left no depression. The ophthalmoscope showed marked bilateral choked disc. The pupils were of normal size and responded to light. Both drumheads were very protruding, of a pale grayish-yellow color; the hammer was not visible. The left mastoid was tender on pressure, though otherwise normal like the right one. There was no swelling behind the mastoid. The veins of the neck showed no abnormality.

Paracentesis of both drumheads evacuated considerable pus without odor. The patient complained only of pain in the head; his intelligence was good. The temperature varied between 37.5° and 38.3°; the pulse was weak and irregular, 104–126 per minute.

At first the combinations of exophthalmus, choked disc, distension of the frontal veins, and sixth-nerve paralysis suggested the very probable diagnosis of a phlebitic thrombosis of both cavernous sinuses, caused by the double purulent otitis media and the probable mastoiditis in the left side. The swelling of both temporal regions could not be explained; but owing to the symmetry and the lack of abnormal resistance or of œdema we regarded it as an abnormality of the skull, or an unusual development of the temporal muscles. It seemed most probable that the phlebitis was caused by the left ear, as that was the side most affected and the exophthalmus was most pronounced on that side. The bilateral changes in the eyes did not oppose this supposition, because transmission of inflammation from one side to the other is not infrequently observed, because of the close connection of the two cavernous sinuses through the circular sinus. The extension of the otitis media to the cavernous sinus could have occurred in various ways. The suppurative process in the middle ear may have involved the venous plexus, which intimately surrounds the carotid artery in its canal and is in direct communication with the cavernous sinus. Another possibility was the infection of the lateral sinus or one of the petrosal sinuses from a neighboring diseased mastoid cell, and extension of the phlebitis to the cavernous sinus. Tumors may press upon the cavernous sinuses and, independent of ear trouble, give rise to the above group of symptoms.

Notwithstanding the evacuation of pus from the tympanic cavities, the general condition remained the same during the next few days. On October 7th the boy complained of severe pain in the left ear, and the left mastoid was more tender. As the puncture opening of the drumhead had closed, paracentesis was again performed, with a fresh discharge of pus. The pain did not diminish, and the temperature on the following day was 38.2° morning, 39.2° evening. We proceeded to open the left mastoid on the same day, realizing the danger of narcosis in the presence of increased intra-cranial pressure and a weak pulse. Chloroform was employed, as Macewen has pointed out the dangers of using ether under these conditions. The mastoid cells appeared normal. On opening into the middle cranial fossa the dural veins were found very congested. Before the antrum was reached, respiration ceased, and no pulse could be felt. After vigorous stimulation the patient revived somewhat, and the operation was brought to a close without exposure of the lateral sinus.

In the following five days the temperature was 38.6° to 39.5°, the pulse 140–150. During the next four weeks the temperature fell somewhat, the pulse became slower; the objective signs remained the same, the mind was clear, and the headache occasional. On November 13th, without a rise in temperature, the headache became more severe, the patient was restless, pulse 144, respiration 66. On the next day the back of the neck was decidedly rigid, and death occurred in a few hours.

The autopsy (Prof. Lubarsch) showed that there was no phlebitis in any sinus. Both lateral sinuses in their course along the temporal bones were completely occluded by greenish tumors originating in the sinus-wall. Similar tumors, starting from the base of the skull, had invaded the temporal bones. The sphenoid was also perforated with tumor masses. In the posterior parts of both orbits and in the temporal muscles tumors were found as large as a hazelnut. The microscopic examination confirmed the diagnosis of chloroma, previously made from the green color of the tumor.

Prof. Lubarsch will investigate the pathology of this case, so I shall not go into further particulars concerning the autopsy. I should, however, like to emphasize that the supposed symptoms of a phlebitis of the cavernous sinus—exophthalmus, sixth-nerve paralysis, choked disc, dilatation of the frontal veins—may be caused by retrobulbar tumors where the cavernous sinuses are unaffected. It is undecided whether the double purulent otitis was the result of the tumor formation or an accidental complication.

THE LITERATURE ON CHLOROMA OF THE TEMPORAL BONE AND OF THE EAR.

Since writing the preceding paper, I have looked over the entire literature on chloroma, and find that the temporal bone and the ear are involved in half of the cases of this remarkable and rare tumor; twenty cases of chloroma have been described, of which ten showed ear symptoms. In two of these cases, though ear symptoms were observed during life, the ears and the temporal bones were not examined clinically nor anatomically. In the remaining eight the tumor in the temporal bone was examined anatomically. Mine is the only case where a clinical examination of the ear was made.

Chloroma occurs always multiple, and generally in children or in young adults. Its origin is usually in the dura, in the wall of a sinus, in the pericranium, and in the cavities of the bonus of the skull, as well as in the orbits. It occurs very frequently bilaterally symmetrical. The temporal groove is a place of predilection, the chloroma then develops from the periosteum or in the substance of the muscle. If I had known this fact, I could have made the diagnosis from the marked swelling of both temporal regions. The frequent localization in the sinus and the orbits, associated with disease of the ear and the temporal bones, makes the knowledge of the tumor both important and interesting to the otologist, especially in a diagnostic line.

The reports of autopsies in reference to the involvement of the temporal bone and the ear, are, as far as they are obtainable, unfortunately very brief and incomplete. My abstracts are hardly shorter than the descriptions furnished by the authors.

REPORT OF THE LITERATURE.

1. Durand Fardel, *Bulletin de la société anatomique*, tome xi., 1835, p. 195. Tumor in the auditory canal and middle ear of both sides.

2. King, *Monthly Journal*, August, 1853. Both temporal bones, outer surface of mastoid processes, base of the petrous bone (with erosion of the bone), lateral sinus. The bone of the middle ear is discolored and soft.

3. Aran, *Archives générales de médicine*. October, 1854, p. 385. Among other symptoms: facial paralysis, subjective noises, and deafness. Tumor in

lateral sinus, inf. petrosal sinus, changes in the tympanum ("le tissu est gris et amincie") and other localizations.

4. **Balfour**, quoted by Aran. Deafness, vertigo, otorrhœa, tumor "sur le temporal droit."

5. **Dressler**, *Virchow's Archiv*, 1866, xxxv., p. 605. Swelling in the temporal fossa and on the mastoid. Tumors in the posterior part of the temporal bone and in the lateral sinus.

6. **Behring** and **Wicherkiewicz**. *Berliner klin. Wochenschrift*, 1892, No. 33. Deafness, subjective noises, swelling of the mastoid, facial paralysis. Tumors in the mastoid cells, in the contiguous muscles, and in the stylo-mastoid foramen.

7. **Gade**, *Nord. med. Archiv*, 1884, xvi., No. 9. Otalgia and otorrhœa. Tumors in the temporal part of the zygomatic process, in the middle cranial fossa, in the tympanum, and labyrinth of both sides.

8. **Horing**. *Contribution to our Knowledge of Chloroma*. Dissertation. Tübingen, 1891. Pain in the ear, swelling behind both ears, and deafness were the first symptoms. Clinically and at autopsy no further mention of the ears. Tumors of the lateral sinus producing a prominence externally on one side of the skull.

9. **Dock**. *Amer. Journ. of the Med. Sciences*, Aug., 1893. Exophthalmus, swelling in both temporal regions, deafness, tumors in the walls of the sinus, in the orbits, and in both temporal fossæ. The ear was not examined.

10. **Körner**. See above.

The rest of the literature (cases without involvement of the ears or the temporal bones) can be found in the articles of **Lang**, "Monographie du Chloroma," *Archives générales de médicine*, 1893, vol. ii., 1894, vol. i.; **Dock**, see O. **Schmidt**, *Ein Fall von Chlorom*. Dissertation. Göttingen, 1895.

RESPIRATORY CLOSURE OF THE EXPOSED LATERAL SINUS AND AIR-EMBOLISM.

BY PROF. O. KÖRNER, ROSTOCK.

Translated by Dr. ARNOLD H. KNAPP, New York.

RESPIRATORY movements of the lateral sinus, exposed in its temporal portion, have, as far as I know, only been observed by Jansen (*Archiv für Ohrenheilkunde*, vol. xxxvii., p. 21, Case 18), and by Schwartze (*Arch. f. Ohrenheilk.*, vol. x., p. 23, Case 2).

In Jansen's case the sinus was laid bare from the upper bend downwards for 5 *cm;* it was situated about 1¾ *cm* behind the auditory canal, and was covered with a thick, whitish-gray pseudomembrane. The sinus did not feel hard, and sank repeatedly during respiration. Aspiration of the sinus was without result, though pus escaped through the puncture opening. The sinus was incised throughout its length; the walls were found thickened, and the lumen contained broken-down thrombolic clots of a greenish-yellow color. Above, there was a dark hemorrhagic mass, presumably the upper limit of the thrombus; below, the thrombus was not disturbed.

I have recently made the following similar observation:

Acute suppuration in both temporal bones after measles; severe pyæmia with multiple purulent metastases in the joints. Opening of both mastoid processes and three joint abscesses. Death six hours after the operation. No autopsy.

W. T., four and a half years old. Two weeks after measles developed an acute suppurative otitis in the right ear. One week later, rise of temperature, violent chills, painful erythemata over the extremities. The left ear became affected, the temperature continued high; the right parotid, the left elbow, and the left foot were swollen. The mastoid processes had never shown any local signs and no tenderness. The lumen of the auditory canals was normal.

Operation.—The right mastoid process was opened. A large abscess cavity was evacuated, and the lateral sinus exposed for a distance of 2½ *cm*. The sinus wall was smooth, gray, and pulsated. The left mastoid was then opened and an abscess cavity found. The sinus appeared normal and was situated quite anterior and superficial, covered by bone of only 2 *mm* in thickness.

The sinus showed slight pulsation synchronous with the pulse. The patient coughed, and during the following deep inspiration we observed that the sinus collapsed, then dilated, and with the next inspiration again fell in. When the sinus was flat it appeared gray, but became blue when full. After a fit of coughing, the sinus filled so suddenly and tensely, that it seemed near to rupture; then the respiratory movements set in. When the sinus was collapsed, we could see between the sinus wall and the bone in either direction. To prevent further coughing the narcosis was stopped. The abscesses in the body were incised. Death followed six hours later. No autopsy.

An inspiratory closure of the sinus, laid bare and exposed to the atmospheric pressure, can only occur when the sinus is patent towards the heart, and closed off towards the brain; thus during inspiration the blood is aspirated toward the thorax, and cannot be replaced from the brain, or owing to cerebral anæmia the necessary amount of blood is not supplied quickly enough. The sudden beginning of the respiratory movements on a deep inspiration following coughing suggests the possibility that a thrombus situated proximally was dislodged by the coughing.

Whenever the suction power of the inspiration is so strong that the sinus collapses, air would be aspirated if the sinus were open, and death might follow through air-embolism.

Hitherto but one case of death after air-embolism of the lateral sinus has been reported (Kuhn, these ARCHIVES, vol. xxvi., No. 1). Our case leads us to think that the danger of air-embolism in opening the lateral sinus is greater than is generally estimated.

Kuhn, in his article, has entered upon the various conditions and precautionary measures which must be observed in opening and evacuating a diseased lateral sinus to prevent air-embolism.

When the sinus shows respiratory movements, it should only be opened after the ligation of the jugular vein. We have seen that inspiratory suction may occur suddenly in a previously quiet sinus, and this is an additional plea for the ligation of the jugular vein before opening the sinus in all cases where the presence of a firm occlusion of the blood-channel in the direction of the heart is not known to exist.

A CASE OF OTITIC BRAIN-ABSCESS IN THE OCCIPITAL LOBE.

BY DR. J. MORF, OF WINTERTHUR, SWITZERLAND.

Translated by Dr. EDWIN M. COX, New York.

SINCE the appearance of Körner's work, *The Otitic Diseases of the Brain, its Membranes and Blood-vessels*, the literature of otitic brain-abscess has increased so much, that it may be superfluous to make any further contribution to this subject. I think, however, that a recently treated case of otitic abscess in the right occipital lobe is of sufficient interest to be brought to general notice. Dr. Keller in Wald (Zürich) gave me on February 4, 1896, the following facts in the history of the patient.

J. J. K., engineer, fifty-six years old, up to the present well, became ill in consequence of exposure to cold during tunnel construction on November 20, 1895. He had chilly feelings, pain in the right ear, and occipital headache. He was treated by hot water syringing of the auditory canal, but without benefit, and since the condition became worse, he sought the advice of an aural surgeon in Zürich on Dec. 6th, who treated him three times in fourteen days with the idea that there was a small abscess in the right middle ear. There was no discharge of any kind. Mr. K., who was exceedingly sensitive, after two punctures of the drum membrane which did not bring any pus to light, feared further painful procedures and, seeking treatment by a specialist, consulted me. The pain in and about the ear was at times very severe and became less only temporarily with the use of migrænin, warm applications, and local blood-letting. Temperature, 37.6°–38° C., no chills.

I saw the patient in consultation with Dr. K., for the first time on February 6, 1896, and made the following notes: Very stout man, with largely developed panniculus adiposus. Except for a somewhat fatty heart, internal organs healthy. Right external ear slightly prominent; over the mastoid moderate œdematous swelling. Fossa mastoidea somewhat tender. Posterior upper wall of the auditory canal markedly protruded downwards so that the drum membrane was not visible. Whispering audible to right ear at the ear; to left ear, the length of the room, about six metres. In the right ear, Politzer's procedure showed a sudden penetration of the air with slight rattling, and an improvement in hearing so that whispering was audible at 20 *cm*. Cranio-tympanic conduction lateralized to the right ear. Rinné negative on right side.

Nose and naso-pharynx showed no changes. About 2 *cm* behind the middle of the posterior border of the mastoid there was a small area of the skull tender on pressure which could be covered by the end of the thumb. Appetite fair. Patient complained of right occipital headache. Except for the sensitive spot already mentioned, the skull is nowhere tender on percussion. Temperature at this time 36° C, pulse 72–76, urine without sugar or albumin, no paresis anywhere, no paralysis, no vomiting, no dizziness, and no changes in the fundus of the eye. No otorrhœa. I made the diagnosis of a suppurative process in the middle-ear cavities, and ordered rest in bed, with ice applications. At the same time, I held out in prospect the opening of antrum, in case the inflammatory appearances did not soon disappear.

February 15*th*.—Over the right concha extending 2 or 3 *cm* beyond its line of insertion, and backwards over the mastoid process, there is a marked swelling, in which deep fluctuation can be made out. The concha itself was strongly pushed out. Temperature, pulse, and fundus of the eye, normal. Pain in the right temporal and occipital regions. It was immediately decided to open the mastoid antrum, and we proceeded under chloroform narcosis. After the usual preparations, a large curved incision was made, extending from a point 2 *cm* over the external ear and encircling it, and ending below the mastoid process. After division of the soft parts, which were about 4 *cm* thick, a subperiosteal abscess, containing about a tablespoonful of creamy, not foul-smelling pus, was evacuated. Since there was no discolored spot of bone and no fistula to be discovered, a typical chiselling of the mastoid was undertaken, and in order to get more room, the external half of the upper posterior wall of the auditory meatus was also removed. The bone was ivory-like, and exceedingly compact. First, at a depth of about 2 *cm*, a cavity the size of a hemp-seed was opened through which a probe easily entered the tympanic cavity. This seemed to be the antrum diminished in size; the mucous membrane of this cavity was deep red and swollen; the cavity contained no fluid; no pus was to be seen anywhere. The operation wound was tamponed with iodoform gauze, and a few sutures used to diminish the size of the wound in the soft parts. Gauze dressing.

Beyond a slight elevation of temperature (38°) on the day after operation, and some swelling of the right upper lid, both of which conditions had disappeared on the following day, nothing alarming could be discovered. The patient's general condition became better, his appetite increased in the following days, the headache became less, and the swelling above and behind the ear disappeared. The sutured parts of the wound healed *per primam*.

On March 13th, Dr. K. wrote to me: "The general condition of the patient makes evident progress, he spends almost the entire day about the room, and is able to give much attention to visitors and to business. He still complains occasionally of severe pain in the head, only he now localizes it more in the region of the wound that is above and in front of the ear. No brain symptoms, no fever, appetite good, and bowels regular. Sleep sometimes disturbed. When the weather is good, the patient is able to go for short walks." On March 23d Dr. K. wrote: "To our astonishment, Mr. K. has, during the last two days, had again severe pain as formerly behind and above the ear, and also in the right frontal region. Temperature 37.3°, pulse 104. This morning he vomited twice."

On my visit, on March 24th, the patient again felt better. I made out a slight hyperæmia of the right optic papilla; the left was normal. No signs of paralysis, or of cortical irritation. Tendon reflexes not diminished. Temperature and pulse normal. The upper posterior wall of the auditory meatus no longer swollen, the drum membrane slightly scaly. Whispering is audible in both ears at six metres, and there is no rattling during the Politzer test. There is pain over the whole right side of the head, no hemiopia, sensorium unaffected, as was the case throughout, no dizziness, and no ataxia.

March 29th.—Well marked optic neuritis on the right side; less on the left. Otherwise condition the same.

April 26th.—Patient's condition has remained the same up to this time. Operation wound almost healed; patient feels somewhat weak. Repeated, involuntary trembling movements occur in the left leg. Evening before this, patient when he wished to stand up, fell suddenly to the floor, and was unable to rise on account of imperfect control of the left arm and leg.

April 28th.—Patient lies on his back, respiration somewhat labored, left angle of the mouth hangs down somewhat; the naso-labial field is obliterated, and the mouth is drawn to the right. The eyelids and eyes are moved normally, both pupils react properly, and the forehead can be furrowed even on the left side. The grip is decidedly weaker on the left than on the right. Patient localizes tactile sensations badly, and there is analgesia of the whole left side. Left leg almost entirely paralytic, speech undisturbed, sensorium normal, sight good, no hemiopia. Pulse 84, temperature 37.4°, lungs normal.

April 30th.—Left arm and leg and the lower branches of the facial nerve completely paralytic; complete left hemianæsthesia. Speaks thickly, and swallows frequently; the uvula diverges to the right. Respiration accelerated and labored. Temperature 37.2°. Pulse 88–90. Complains of occipital and frontal headache. Sees well, pupils not dilated. Suggested operation refused.

May 1st.—Condition the same, patient occasionally unconscious.

May 2d.—Speech stammering, respiration stertorous, great difficulty in swallowing. Pulse small, 140–144, temperature 38°. Patient is unconscious and does not control the sphincters.

May 4th.—Died with increasing difficulty in respiration.

Autopsy thirty-eight hours after death. Examination of head only. Bones thick and hard with spot of thinning. Vessels of the cerebral membranes tensely filled, pia mater very œdematous. Dura 2½ *cm* behind the angle of the sinus transversus thickened and dark reddish-brown over an area an inch in diameter, but without deposit of lymph; pia at the same place only slightly darkened, and loosely adherent to the dura.

On removal, the right cerebral hemisphere was seen to be larger than the left, the end of the right occipital lobe overlapping the left about 2 *cm*, and the convolutions somewhat flattened. The circumscribed area of adhesion of the membranes extended as far as the third occipital convolution. Here the cortex appeared whitish and shining, but on the superior aspect it was smooth, moist, and glistening. A horizontal section at the level of the dorsal surface of the *corpus callosum* showed normal brain substance. A second section at an angle of 40° or 45° to the first, carried downwards and outwards, opened two abscess-cavities. The smaller one lay 2 or 3 *mm* beneath the cortex, and its wall was partly formed of the partially softened cortical layer of the third, and the lower half of the second occipital convolution. This cavity was about 3 *cm* in diameter. In its inner wall was an opening through which a probe passing through a canal about 1 *cm* long entered the second and larger abscess. The smaller abscess was moderately full of greenish-brown pus without any offensive odor, the large cavity was filled with about two tablespoonfuls of pus similar in character. The long dial meter of the larger cavity was 4.8 *cm*, the transverse 3.2 *cm*, its posterior wall was 3 *cm* from the extremity of the occipital lobe, the anterior 2 *cm* from the *nucleus lentiformis*, and 1 to 1½ *cm* from the *thalamus opticus*; it lay above the posterior horn of the lateral ventricle. There was no distinct membrane lining the cavity, but its walls were ragged, with many small hemorrhages scattered through them, and with the neighboring brain substance softened to a limited extent. No signs of meningitis anywhere. The ventricles contained a practically normal amount of clear cerebrospinal fluid.

Two and a half *cm* behind the angle of the right sinus traversus, beneath the altered and thickened area of dura, lay a cavity in the bone of 2–3 square *cm* in size and ½ *cm* deep. This was filled with granulations, and communicated by means of a canal 3½ *cm* long with an isolated cell in the mastoid lying about ¾ *cm* behind and outside of the antrum. This cell, like the canal, was filled with granulations, contained no pus, and was imbedded in compact bone. It was a few millimetres behind the operation canal, with which no communication was discoverable. Except for the antrum and this cell, the mastoid contained no space holding air. All sinuses were uninflamed and patent, the drum-membrane and ossicles were normal. Some congestion of mucous membrane of middle ear was present. Labyrinth, aqueducts, and the seventh and eighth nerves were uninvolved.

We have to deal in this case with one of those rarer cases in which, in consequence of an acute otitis media, abscess of the brain results. According to Grunert (quoted by Körner, *l. c.*), otitic brain-abscesses are brought about in 9 % by acute, and in 91 % by chronic middle-ear inflammation, and Jansen[2] found in the Berlin University Clinic among 2650 acute cases of middle-ear suppuration, only one complicated with brain-abscess, but among 2500 chronic cases of otorrhœa there were 6 cases of brain-abscess.

The course of the disease was from the beginning atypical, and did not present the usual picture of acute suppurative otitis media. In the chief spaces of the middle ear, the inflammatory appearances soon subsided, and never reached that degree of intensity present in the air spaces of the mastoid. Therefore no perforation of the drum-membrane occurred, there was no otorrhœa, and paracentesis neither disclosed the presence of pus nor allayed the pain. It has long been known, and Bezold shows in his "Diseases of the Mastoid Process"[3] and elsewhere, that inflammation in the tympanic cavity and of the drum-membrane often subsides, thus restoring normal or almost normal hearing, while the disease in the mastoid is steadily advancing. Thus it is of no consequence if this observation is made in a case of otitis with brain abscess. Such an occurrence is, however, not common, at least I find only 8 such cases mentioned in the literature of the subject, 1 each by Baginsky and Gluck, Schmiedt, Gruber (all quoted by Körner, *l. c.*), Hatsch, Shubert (quoted by Blau),[4] Schmiegelow,[5] and Mathewson.[6] Furthermore, Bezold (*l. c.*, p. 317), mentions a case of brain-abscess, not operated upon, in which three weeks before death "the acute middle-ear suppuration had ceased with closure of the drum-membrane and almost normal hearing."

How far the sclerosis of the mastoid process is responsible for the occurrence of intra-cranial suppuration I dare not decide, although the early presence of a tender spot behind the mastoid, the early occurrence of headache, and the late appearance of pus superficially point towards such responsibility. The views of various writers on this point vary. While some consider the ivoryizing and hypertrophy of the bone, a defence against the extension of the middle-ear suppuration into the cranium, others think that this increases the danger.

With reference to the location of the brain abscesses Körner (*l. c.*) says: "Those abscesses caused by disease of the temporal bone lie in neighboring parts of the brain, that is, in the temporal lobe, or in the corresponding half of the cerebellum, very rarely in the pons or in the peduncles of the cerebellum. Exceptions to this rule are rare." This state of affairs is explained by the fact that the primary suppuration in the middle ear reaches the cranial cavity either through natural passages (aqueducts, etc.) or through the bony wall of the cranium, and then penetrates the meninges already adherent to each other, or perforated by a fistula. Bergmann's teaching, that otitic brain-abscesses are always distant from the focus of disease, and separated from it by healthy brain substance, is contradicted and considered untenable by Körner and Jansen.

Anatomical relations considered, we ought to seek, as a rule, the point at which an abscess first breaks into the cranium in the anterior-upper (tegmen tympani) or in the posterior surface of the petrous portion of the temporal bone, that is, the posterior wall of the antrum, the saccus endolymphaticus, etc. Frequently the perforation is in the sinus transversus, especially in the descending portion, more rarely farther backwards. The last may be brought about, according to Hansberg[1], in acute suppuration, because in acute middle-ear suppuration the tissue immediately about the middle-ear spaces reaches a higher degree of hyperæmia than in chronic otitis, and thus is more suitable for the propagation of inflammatory processes to distant points.

According to Körner's rule, we should have expected in my case suppuration in the cerebellum, because the bone in the neighborhood of the sinuses involved in the disease was in the cerebellar fossa, and a glance at the anatomical relations seems to bear out this view. The following portions of the brain lie in relation to the petrous portion of the temporal bone: 1, the temporal lobe of the cerebrum, which covers the whole anterior and upper surfaces; 2, the cerebellum, which covers the posterior surface; 3, the pons, and the cerebellar peduncles adjacent to the internal auditory meatus. Since the temporal lobe overlaps posteriorly the upper margin of the petrous portion, and with its posterior parts covers the tentorium, the occipital lobe comes nowhere in contact with that bone. Consequently middle-ear suppuration does not endanger to the same extent the occipital lobe as the temporal lobe and the cerebellum. Nevertheless the occipital lobe can be involved, and evidently in two ways, one directly from the temporal lobe, and another from disease of the bone or meninges covering it. As already noticed, such suppurative bone involvements lie usually in the posterior fossa near the sinus transversus. Disease of the venous channels, even phlebitis and thrombosis, rarely lead to suppuration in the brain (Körner, Jansen, *l. c.*). We should expect from the anatomical relations and structure of the sinus transversus, and the linea transversa of the occipital bone, that a focus of disease in the bone under the linea transversa would give rise to cerebellar abscess, that a similar focus above the line would cause abscess of the occipital lobe, and furthermore that any focus involving tissue on both sides of the line would endanger both portions of the cranial contents; this we find to be the case. Therefore, if in consequence of an extradural otitic suppuration an abscess in the occipital lobe occurs, we may conclude that the suppurative process has had its origin behind the angle of the sinus transversus and above the transverse line in the superior occipital fossa. This conclusion does not accord with the circumstances in my case, for in spite of the fact that the bone abscess lay under the transverse line, the brain abscesses were in the occipital lobe. I think that this apparently contradictory appearance must be explained by the fact that the thickened dura of the cerebellum afforded a defence against infection, while it did not provide sufficient resistance to the suppurative process inwards and upwards into the occipital lobe.

The views of writers on the occurrence of multiple otitic brain abscesses are diverse. Körner (*l.c.*) considers them rare, and warns us against confusing them with metastatic abscesses. Schwartze[9] and Blau (*l.c.*, p. 118) and others disagree with him. Treitel[10] calculates from Körner's and Schwartze's statistics that 16–17 % of all cases have multiple abscesses. Abscesses in the occipital lobe of such character are rare, and Körner mentions one case of such character described by Sahli, in which unfortunately on account of advanced softening of the cerebral tissue the position of the abscesses could not be accurately determined. No description of the condition of the petrous portion of the temporal bone is given.

Concerning the age of the abscess, I am unable in my case to come to any definite conclusion, unless I know the time of beginning of the disease in the middle ear, the beginning of the optic neuritis, and the definite manifestation of the presence of abscess. The presence of pressure-pain does not decide this question. An abscess must reach a considerable size in order to cause an optic neuritis, and furthermore the disease in the bone would sufficiently explain the pressure-pain. The exacerbation of headache, the vomiting and the acceleration of the pulse occurring on the 21st, 22d, and 23d of March would perhaps give us a surer means of judging when the abscess began.

My observation appears to me important from a diagnostic point of view. In the latent stage, we had good reason for supposing the presence of disease in the cerebellum. The violent right-sided occipital headache, and the tender spot behind the mastoid pointed in that direction. Although cerebellar ataxia and cerebellar vertigo were absent, the reason for this view of the case was in no wise diminished, since these localizing sumptoms, in spite of the relative frequency of cerebellar abscesses, have been observed, according to Körner, only once clearly (Feinberg[11]). Rigidity in the muscles of the neck may also be absent. The later pain in the forehead was of no special significance, since localized headache does not always point towards disease at the site of localization. Furthermore, the occipital pain was continuously present, but since these symptoms are found in cases of extradural abscess, the diagnosis of cerebellar abscess was not permissible.

As soon as the abscess manifested itself, the appearance of things was changed. According to our present knowledge of focal symptoms we think that we are not likely to make a mistake in a case of abscess in the temporal lobe. Notwithstanding that we know that the focal symptoms must be considered as the result of the influence of the abscess upon the internal capsule, and that an occipital abscess is capable of such action, nevertheless the absence of hemiopia directed our attention continually towards the temporal lobe.

Körner thinks that in some cases of abscess in the temporal lobe, if it lies far back and encroaches upon the occipital lobe, a subcortical lesion of the visual tract may lead to hemiopia. "The occurrence of hemiopia with other lesions of the internal capsule indicates that it has been brought about in the same manner as the latter." Why we missed entirely, in our case, any hemiopia, in spite of the fact that the whole occipital lobe was involved in the abscess, was perhaps because the foci of disease in the *centrum semiovale* can only cause symptoms of non-function when the whole involved tract is destroyed, and because in our case a small portion may have remained to afford conduction from periphery to centre or *vice versa* (Edinger[12]). It would be noteworthy, then, that the visual fibres passed the internal capsule uninjured, while still other symptoms of non-function indicated that the posterior part of that structure was involved. Be that as it may, we may have, as our case shows, a pretty extensive abscess of the occipital lobe without having any apparent involvement of the visual tract. Accordingly an accurate localizing diagnosis may be impossible.

The normal state of hearing on the left side spoke against the presence of an abscess in the temporal lobe. Not improbably, no defect in hearing would have been discovered even if looked for in the active stage of abscess formation, for very large abscesses have been found in the temporal lobe without any disturbance of hearing on the other side, and opposite-sided deafness has been only in a very few cases referred for its causation to abscess in that lobe.

Since no rupture of the abscess into the ventricle could be demonstrated, the cause of death in my case must be put down to cerebral compression, and it is remarkable that during the whole course of the disease there was no slowing of the pulse.

Whether a second operative procedure would have been beneficial is not evident, for it is very questionable, whether, even with a very extensive exposure of the posterior fossa, the second deep-lying abscess would have been disclosed, and whether the narrow communication between the two portions of the abscess would have been large enough for drainage. The relation of the posterior horn of the lateral ventricle would not have permitted such deep incision as is possible in abscess of the temporal lobe.

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REPORT OF THE DIVISION FOR THE DISEASES OF THE EAR, NOSE, AND THROAT OF THE COPENHAGEN MILITARY HOSPITAL DURING THE YEARS 1888–93.

By Dr. AD. LEVY,
CHIEF OF CLINIC.

Translated and abridged by Dr. ARNOLD H. KNAPP, New York.

THIS clinic was opened on April 10, 1888, and consists of an out-door patient department, and of several wards, with a total of forty-two beds. From 1888 to 1893, 3873 patients were treated; the following is a classified list of the diseases.

DISEASES OF THE EAR.

THE EXTERNAL EAR AND THE AUDITORY CANAL:

Aspergillus	2
Cerumen obturans	342
Congelatio aurium	1
Corp. alien. meat. audit. ext.	14
Corp. alien. lobuli auris	2
Eczema auris	19
Furunculosis meat.	183
Herpes auris	1
Necrosis meat. audit. ext	1
Neuralgia	1
Otitis ext. ac.	43
Otitis ext. chr.	11
Polypi, exostosis et papulæ meat.	9
Ulcera meat.	4

The cases of impacted cerumen make 9.3 per cent. of all of the cases.

One of the cases of foreign body in the ear was somewhat severer than is usual: A six-year-old boy had introduced a piece of wood in his ear. After unsuccessful attempts at extraction, he came to the clinic and, on examination, the piece of wood was found to have been forced into the middle ear through the upper and anterior part of the drum-membrane. Under chloroform it was easily removed with a forceps, and measured 1½ *cm* in length, and ½ *cm* in breadth. The after-treatment consisted of the instillation of menthol-alcohol 1:100, and occlusion. The large perforation healed in one week, without suppuration and normal hearing.

Several flat papules were found in the meatus of a syphilitic patient, and disappeared after antisyphilitic treatment.

There were two cases of syphilitic ulcer; these were arched, one-quarter of an inch broad, covered by a dirty grayish membrane, and contracted the lumen of the canal; they disappeared with the antisyphilitic treatment. Syphilis seems to be frequent in the external ear and, according to the syphilographer, may appear here isolated.

Two cases of pedunculated exostoses, attached to the posterior wall, and nearly occluding completely the canal, were readily removed with a chisel. The anæsthesia employed was the instillation of a 30 per cent. cocaine solution in the auditory canal.

THE DRUM MEMBRANE.

Myringitis ac. et subac.	185
Myringitis chr.	22
Rupt. traumat. mbr. tymp.	34

Most of the cases of myringitis were caused by the cold water in bathing.

The ruptures of the drum membrane were generally caused indirectly by the report of a gun or cannon near-by, and were usually multiple and extensive. Contrary to usual custom, we have used concentrated alcohol in the treatment, and have had all perforations heal in less than eight days, and always without suppuration. The patients were kept in bed.

THE MIDDLE EAR.

Otitis med. ac. catarrh	428
" subac. cat.	30
" ac. cat. in chr.	56
" chr. cat.	367
" ac. suppur.	585
" chr. suppur.	255
" ac. suppur. in chr.	78
Caries partis petrosæ	14
Mastoiditis	10
Seq. otit. med. ac. cat.	6
" " " chr. suppur.	193

In the last four years we have discontinued the use of the Eustachian catheter in the treatment of catarrhal otitides, and employ a modified Siegel's speculum. This change has been more than satisfactory, and the results most encouraging. The introduction of the tubal catheter is generally difficult, often impossible, and always unpleasant to the patient. In employing Siegel's speculum to determine the motility of the drum membrane, or the presence of adhesions, etc., we noticed that almost always the hearing was improved for a longer or shorter length of time. This induced us to try the speculum in the catarrhal forms of middle-ear disease, and we have never seen any ill effect to follow its use.

The Siegel speculum which we use has two openings fitted with rubber tubes; one with a mouthpiece to aspirate the air, the other to be used as an auscultation tube. We may thus judge of the force required to rarefy the air in the auditory canal, observe directly the changes brought about in the position and relief of the drum membrane, and by means of the auscultation tube judge the patency of the Eustachian canal, the presence of fluids, etc. In short the action is the same as that of the Eustachian catheter, the after-effect more lasting, and the introduction painless.

The number of our cases of acute purulent otitis in the last three years is double that in the first three years, still we have not been forced to do a single mastoid operation during the last three years. In the treatment we lay great stress on rest in bed, and to this we think are chiefly due our good results.

Paracentesis is done as early as possible. Instillations of alcohol are continued, and irrigations are only employed when the secretion has a bad odor. To show that the paracentesis shortens the course of the disease we had tabulated the cases with paracentesis and those with spontaneous perforations as follows :

1889.

27	Paracenteses, average length of disease	18.5 days.
28	Spontaneous perforations, average length of disease	39.3 "

1890.

6	Paracentesis, average length of disease	21 days.
30	Spontaneous perforations, average length of disease	31 "

1893.

13	Paracenteses, average length of disease	13.6 days.
26	Spontaneous perforations, average length of disease	24.4 "

For the three years :

Paracenteses	17.7 days.
Spontaneous perforations	32.2 "

The three operations on the mastoid presented no noteworthy features.

A remarkable case of death after ear disease deserves to be reported. The patient had a purulent otitis on the right side with spontaneous perforation fròm which he recovered in one month. Two weeks later he returned with moderate pain and slight deafness in the same ear, and the signs of a catarrhal otitis. The pain disappeared in a day ; the patient then complained of pain in the abdomen, vomiting, and slight fever. One week later stupor, vertigo without headache, coma, and death. The autopsy revealed caries of the lower part of the petrous bone, and pus in the right lateral ventricle. The middle ear was normal except for the swelling of the mucous membrane.

THE INTERNAL EAR.

Hemorrhagia auris int.	3
Morbus Ménière	2
Neuralgia auris	14
Surditas	1

Both cases of Ménière's disease recovered in two weeks with three-gram daily doses of quinine.

Most cases of neuralgia of the ear were due to carious teeth.

DISEASES OF THE NOSE.

Caries septi nasi	5
Eczema	20
Empyema antr. Highmor	7
Epistaxis chr	35
Epistaxis ac	25
Erysipelas	3
Fissura aperturæ nasi	4
Furunculosis	25
Polypus	32
Rhinitis chr. hypertr. et atroph	143
Rhinitis luetica	8
Sequ. contus. nasi	2
Periostitis ossis nasi	1
Tumor nasi	1
Ulcera scrophulosa nasi	5

In most of the cases of epistaxis the seat of hemorrhages was the usual one in the lower anterior part of the septum. In one case, however, the bleeding point was situated at the ant. tip of the middle turbinated and in another case there was an area of teleangiectasis just above the lower and ant. part of the septum.

DISEASES OF THE PHARYNX AND LARYNX.

Angina catarrh	25
“ croup	6
“ diphth	8
“ phlegmon	9
“ follicularis	18
Corpus alienum faucium	5
Globulus	5
Hypertr. tonsillaris	18
Pharyngitis ac	6
“ chr	100
Laryngitis ac. et subac	234
“ chr	38
“ tuberculosa	10
Tumores adenoideæ cavi naso-phar	31
Corpus alienum laryngis	2
Tumor pharyngis	2
Polypus laryngis	5

Adenoid vegetations were removed with Gottstein's curette; no recurrence was observed.

The total number of operations is 487, including 204 paracenteses, 31 removals of adenoids, and 11 mastoidectomies. All patients recovered.

BEZOLD'S MASTOIDITIS WITH PYÆMIC SYMPTOMS.

By J. HEGETSCHWEILER, Zürich.[1]

(*With one Temperature Chart. Plate I, II.*)

Translated by J. M. Mills, M.D., New York.

A DISCUSSION of this subject is occasioned by a case of acute empyema of the mastoid portion of the temporal bone with pronounced pyæmic symptoms and proceeding, in the manner described by Bezold, to perforation of the inner wall of the mastoid process.

The history of the case is briefly as follows: the patient, sixty-four years old, previously in vigorous health, became ill on September 14th, of last year, complaining of chills and pain in the left ear and in the head. This was followed three days later by a sero-purulent discharge, that was at that time mixed with blood. The family physician advised syringing with boric acid solution and the frequent use of Valsalva's experiment. About the middle of October he had the first attack of chills, necessitating his going to bed (as up to this time he had been going about), and this also warned him of the seriousness of his illness. Two days after he had two more chills, and three days later, about October 20th, he suffered with considerable pain in the left shoulder and left lumbar region.

On November 4th, of last year, when I saw the patient for the first time, he presented the following appearance: he was of vigorous build, and his appearance was in accordance with his age. Intellect was clear. Moderate fever (37.5° to 38.9°). The left shoulder was swollen and sensitive to touch, and the patient complained of a dull pain in the depth of the left lumbar region. The internal organs appeared normal, and there was no swelling of the spleen. The nasal and pharyngeal mucous membrane presented the appearance of a chronic catarrh.

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[1] Read before Society of Swiss Physicians, Bâle, May, 1896.

The condition of the ear: On the left there was a profuse purulent otorrhea. After cleansing the meatus, the lower half of the tympanic membrane was found to be retracted; in the upper and posterior quadrant, there was a small perforation from which exuded in rapid succession, after each cleaning, a fresh drop of pus. Politzer produced a loud perforation sound. The mastoid externally is unchanged, but somewhat sensitive to touch, especially at the apex. There is neither swelling nor induration along the external jugular vein.

Diagnosis.—The initial chill, the fever curve with its regular evening elevation of temperature,[1] and the metastasis in the left shoulder and left lumbar region—for as such the dull pain in this region was to be considered;—all this in connection with the otitis media purulenta, could only be explained as a pyæmic infection of the entire system, originating in a suppurating focus in the temporal bone. Where this focus was located, whether in a sinus—I thought at first a thrombosis of the lateral sinus—or a vein of the bone (osteophlebitis), was not so easily determined. Against the sinus thrombosis was, above all, that notwithstanding the repeated and careful physical examination of the lungs, by myself and a colleague, who treated him, no morbid changes were found in the lungs, and the subjective symptoms of a pulmonary affection were also absent. Furthermore, the metastasis in the left shoulder and lumbar regions indicated more an osteophlebitic process. For, according to the general opinion, it is especially the small emboli from the veins of the bone that are able to pass through the pulmonary circulation and thus cause infarctus in the peripheral organs.

As a result of these reflections, I felt it my duty to advise the patient to have the mastoid process opened in order to cleanse and remove the source of infection which I suspected was present.

Unfortunately, notwithstanding the forcible representations of the dangers that could arise from a failure to operate, the patient refused.

The local process in the tympanic cavity was favorably influenced by the antiseptic treatment after enlarging the small perforation, and gradually the secretion decreased. On December 25th, the boric acid powder insufflated was found to be dry, so that the otorrhea could be considered at an end.

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[1] See chart.

In the meantime the general condition progressed less favorably. As can be seen from the fever chart, from the 2d to the 24th of November there existed a typical pyæmic fever with low, now and then normal, morning temperature and rising evening temperature. Since the paracentesis had permitted the free exit of the pus gathered in the tympanic cavity, the source of the above condition was to be found in the metastatic inflammation, *i. e.*, the phlegmon of the left shoulder and lumbar region in connection with the focus in the mastoid portion of the temporal bone. As, however, in the meantime, the pain and swelling of the shoulder disappeared spontaneously, this was left out of consideration. Therefore the other metastases were more noticeable. As was shown by the further progress, they were the cause of the high temperature in the month of November.

Three or four days after the last chill the pain reappeared, at the same time in the left shoulder and in the depth of the lumbar muscle. Although the patient at first complained only of a dull pain in the lumbar region, gradually the pain became intense, and finally the boring pain became almost unbearable.

At last there appeared on the surface of the skin a swelling about the size of the palm of the hand, and fluctuation could be detected in the depth. I therefore decided, with the consent of the family physician, to make an opening into the deeply situated abscess as soon as possible, in order to prevent its eventual perforation into the pelvic cavity. The place of distinct fluctuation determined thè line of incision ; about three fingers' width to the left of the spinal column and parallel with it, from the crest of the ilium, extending about 10 centimetres upwards. After separating the skin and the thick fat layer, the fascia lumbodorsalis appeared. This was opened 2 *cm* in width, and the wound dilated with the dressing forceps, whereby a creamy pus was evacuated. Then the fascia was divided in the entire extent of the outer wound, with the probe-pointed bistoury and the wound opening tamponed with iodoform gauze.

As can be seen from the temperature curve, the patient, in the following eight days, was entirely free from fever, which offered additional proof that the high temperature from November 2d to 24th was caused by the metastatic abscess. During the after-treatment I was enabled to convince myself that the pus had already begun to penetrate into the pelvis, so I endeavored to prevent further progress in this direction by carefully tamponing the wound, which was already distended downward.

In the beginning of December the appearance of the disease changed. After the patient had complained of heat and pain in the left heel and sole of the foot, on December 2d an œdematous swelling appeared on the left leg, especially around the ankle, and in the depth of the calf a sensitive cord-like resistance could be felt. Then there was a simultaneous rise of temperature. The diagnosis of inflammatory thrombosis of the femoral vein was evident, but the manner in which it originated was not, as from the existing conditions it could as well have originated in a phlebitic thrombosis starting from a lumbar or pelvic abscess, as from a new embolus of the original focus in the temporal bone. The former supposition was suggested by the appearance of those typical contractions of the thigh characteristic of psoas abscess.

This new complication weakened the patient considerably; he became delirious, and we were compelled to give an unfavorable prognosis, even as regards life. But the strong constitution of the patient, aided by the tonic treatment, enabled him to withstand also these complications, and the case seemed to progress favorably.

But on January 6th of last year, the second day after the recurrence of the otorrhœa, a dense infiltration, about the size of a nut, appeared between the mastoid process and the ascending arch of the lower jaw, *i.e.*, in the parotid region. As this gradually increased, in the next few days, both in the width and in thickness, it interfered with the opening of the mouth.

The expectant treatment to which I was compelled to resort on account of the excessive fear of an operation, had at least this advantage that I had an opportunity to observe and carefully follow the further clinical course. As the infiltration extended farther downward and backward, it reached at last, in one direction, the thyroid cartilage, and in the other the median line of the neck. Above, however, it met with a barrier in the muscles inserted in the mastoid portion of the temporal bone.

As is evident, we have here the clinical picture of what was described at first by Bezold as empyema of the mastoid portion of the temporal bone, with extension of the inflammation under the mastoid process, and has since then been known in the literature by his name. Bezold,[1] however, states that the purulent focus, situated under a threefold muscular layer, could with difficulty penetrate upwards, so that the outer surface of the mastoid portion of the temporal bone, as a rule, remains free. I, on the contrary, was surprised, on January 26th, to see the outer covering of the mastoid, previously closely adherent to the bone, now appearing as a distinctly fluctuating swelling, and which finally extended above the upper attachment of the muscles to the squamous portion of the temporal bone.

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[1] See Schwartze's *Handbuch*, vol ii., p. 320; and *Deutsche mediz. Wochenschr.*, 1881, p. 383.

On January 26th, this abscess perforated into the auditory meatus. As a similar perforation of the pus collected under the mastoid process was not to be expected, I at last obtained permission to open it. This was done on January 28th, by making a large curved incision around the angle of the jaw. The posterior part of the curved incision was carried quite high, and then with the probe-pointed knife I partly divided the insertion of the sterno-cleido muscle on the mastoid process, in order to provide free drainage below for the pus, as far as this was possible, without opening the mastoid process, which I was not permitted to do. After this procedure the discharge ceased within 8 days without further treatment, and since then the auditory meatus has remained dry. L: whisper in 20 *cm*; Rinné + 15 sec.

The deep wound in the neck healed well, with the exception of a small fistula that continued to secrete. Also the wound in the lumbar region closed, leaving only a narrow but secreting sinues.

It may seem hardly justifiable to appear before you with a single case of pyæmia after an acute otitis media, since Hessler, only a short time ago, compiled and described, in his book, 398 similar cases of otogenic pyæmia. Still I believe that the complete picture of pyæmic disease has seldom offered such a variety of symptoms as in this case.

Aside from the initial chill and the pronounced pyæmic fever curve, the following conditions merit consideration:

1. The metastases. They occur in the majority of cases of otitic pyæmia (according to Hessler in 64.3 per cent.), and can therefore be considered as pathognomonic symptoms. In our case, that which first deserves attention is the favorable course of the metastases in the joint in contrast to the insidious and protracted progress of the metastases in the lumbar muscles. The bacteriological examination presented the following:

The direct examination of the pus from the ear on a cover-glass preparation showed numerous diplococci with distinct capsules, which were colored according to Gram.

The pus from the lumbar abscess was obtained right after the opening under antiseptic precautions. It was caught up with a sterilized pipette, and inoculated upon gelatin, which was then poured into Petri-dishes.

The colonies presented a pure culture of the streptococcus. As these appeared only in short, straight, or slightly curved rows and in the diplo arrangement, the supposition that these are the same organisms as were found in the ear discharge is well founded, especially as the differential diagnosis between the diplococcus and streptococcus is, at present, very uncertain.

2. The thrombosis of the left leg. This was most likely, as already stated, due to phlebitis of the vein of the cellular tissue of the pelvis transmitted to the femoral vein. With its development, in the beginning of December, a new fever focus was established, and with its elimination the vitality of the organism threatened to become exhausted. As is apparent from the fever chart, the curve rose again, beginning with 39.7° to the former height, and then, with regular drops, gradually approached the normal on December 23d, when the evening temperature was 36.4°, its lowest point.

3. Bezold's mastoiditis. This confirmed our early supposition of an osteo-phlebitic process in the mastoid cells and demonstrated the necessity of an operation. Its development was aided by the presence of one or more of the terminal cells which frequently occur at the age of our patient. These, by hastening the perforation downward, rendered a kind of spontaneous healing possible and thereby saved the patient, so fearful of an operation, from the danger of a penetration into the cranial cavity.

The fever, varying between 36.8° and 38.7°, and mostly intermittent, was most likely caused by the extension of the suppurative process in the soft tissues on the outer surface of the mastoid, following the perforation in the beginning of January. Of interest was the rapid spontaneous cessation of the otorrhœa with closure of the perforation after the pus, collected here, had obtained a free outlet by the extensive incision and detachment of the sterno-cleido muscle.

Also from a diagnostic standpoint the case, in my estimation, is of a certain importance, inasmuch as it confirms the statement of Köner in his monograph on *The Otitic Diseases of the Brain*,[1] that " when in conjunction with an acute otitis media, and notwithstanding a free discharge, high fever, with or without a chill, occurs, then is the supposition justified that it is a pyæmia from an osteophlebitis. And if in addition there are metastases in the joints, bursæ, or muscles, the diagnosis is certain."

And finally, it offers an important indication for the treatment, inasmuch as it teaches that *when chills and fever are associated with an acute otitis media, the opening of the mastoid process is indicated when it is unaffected externally, or is not sensitive to touch.* If in addition, as in the majority of cases, metastases develop, then the failure to operate is a professional error only excusable when the patient's consent cannot be obtained.

I have been positively convinced that our patient would have been completely cured, *i. e.*, without a fistula in the mastoid process, and in a much shorter time, if the operative procedure had been undertaken immediately after the first chill.

In view of this case it is inconceivable that Michael would only operate " when such symptoms appear which point to the presence of an intense inflammation of the bone, or to the transmission of the process to the meninges, the brain, or the sinus, or to the presence of pyæmia "!

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[1] See p. 81.

REPORT OF THE THIRTIETH ANNUAL MEETING OF THE AMERICAN OTOLOGICAL SOCIETY, HELD AT WASHINGTON, MAY 4, 1897.

By Dr. ARNOLD H. KNAPP, New York.

The following papers were read:

1. **Goutiness in its Relations to Diseases of the Ear,** by Dr. A. H. Buck, of New York.

After a review of the scanty literature on this subject, the author spoke of the following affections of the ear due to the gouty diathesis: eczema of the auricle and of the external auditory canal, deposits on the drumhead, changes in the mucous membrane of the middle ear. The eczema appears in circumscribed patches. Rarely the adjacent bone becomes involved; presumably a process similar to the one which Garrod has observed in the neighborhood of joints. Local applications are of but little value; the general gouty tendency should be treated.

Discussed by Drs. Tansley and Dench.

2. **The Differential Diagnosis between Diseases of the Sound-Conducting and Sound-Perceiving Apparatus,** by Dr. E. B. Dench, of New York.

The author described the well-known quantitative and qualitative tests in the functional examination of the ear, and passed in review the methods usually employed in locating the seat of the lesion.

Discussion.—Dr. Theobald remarked that occasionally Weber's test gave a different result according as the tuning-fork was placed on the vertex or on the forehead. Dr. Alderton for this reason prefers to place the fork against the incisor teeth. Dr. Blake said that the perception of a tuning-fork varies with the thickness of the skull, and drew attention to the fact that notes produced by Galton's whistle of more than 12,000 vibrations per second were not reliable. Dr. DENCH in conclusion said that he prefers the Schwabach test to the Weber, and employs the former to verify the results of the latter.

3. **Ear Complications of Influenza,** by Dr. W. P. EAGLETON, of Newark, N. J.

The author emphasized the frequency of ear affections in influenza and the presence of the Pfeiffer bacillus in the discharge. The symptoms are more severe than in the uncomplicated otitides, and the disease more rapid. Hence in otitis media paracentesis should be done earlier, and in mastoid involvement operative measures should soon be resorted to, as the tendency to destruction of bone is very much greater.

4. **What Symptoms should we Consider most Important as to the Advisability of an Operation in Mastoid Disease?** by Dr. GORHAM BACON, of New York.

In mastoid disease there is always a rise of temperature, which is in children unproportionately greater. The author considers tenderness over mastoid with fever, after the otitis has lasted one week to ten days, suspicious of mastoid involvement. Pressure should always be made over both mastoids in testing for tenderness. Redness, œdema, and tenderness can occur in furuncle. Bulging of Shrapnell's membrane and drooping of the posterior wall of ear canal are pathognomonic signs. Treatment should be early paracentesis, leeches, then ice-coil on mastoid process, and frequent douching of ear. Politzer may be used with caution when the disease is abating and there is a wide perforation. A continuance of the above symptoms makes the operative opening of the mastoid cells necessary. When the temperature has been high for some time it does not always fall immediately after operation.

Discussed by Drs. JOHNSON, DENCH, TANSLEY, and BUCK.

5. **Thrombosis of Lateral Sinus with Perisinuous Abscess; Death; Autopsy.** By Dr. ALDERTON, of Brooklyn.

This is the report of a case with the typical signs of a thrombosis and a thickened jugular vein. During the operation the sinus was exposed; a large perisinuous abscess evacuated before the antrum had been reached. The operation was concluded, but the symptoms persisted, and two days later the thrombosed lateral sinus was incised and cleaned out, though the operation was again not extended to the antrum. The patient died two days later of metastatic pneumonia. At the autopsy, the brain was found normal, the tegmen antri necrosed, and the path of infection extending between dura and bone to the sinus. To the author this case was of great value, because it shows the importance of always exploring the antrum and the advisability of ligating the internal jugular in thrombosis of the lateral sinus.

Discussion.—Dr. DENCH thought that the internal jugular vein should only be ligated in cases where it was visibly affected. In conclusion, Dr. ALDERTON wished to extend the indications for ligating the internal jugular to cases where the wall of the thrombosed sinus was diseased.

6. **A Case of Extreme Deafness in which Great Improvement of Hearing Followed the Use of Pilocarpine,** by Dr. GORHAM BACON of New York.

A man, thirty-three years old, had an otorrhœa after scarlet fever in youth. After an attack of typhoid fever the hearing was greatly reduced, so that he had to use an ear-trumpet, and the bone-conduction was almost absent. The patient was kept in bed and given pilocarpine hypodermically. Improvement was first noticed after two months of this treatment. He then could hear conversation. Both membranæ tympani and ossicles were removed. Hearing became still better and was permanent. The best results of the pilocarpine treatment were seen in cases due to syphilis.

Discussion.—Drs. DENCH and TANSLEY.

7. **Deviated Nasal Septa in Ear Diseases, with a New Operation for their Correction,** by Dr. J. OSCROFT TANSLEY of New York.

This method of operating is performed in two sittings under cocaine anæsthesia. An incision is made along the concavity of the deflection from behind forward. The mucous membrane is dissected from this incision in an upward and downward direction. Pressure is then carefully exerted on the convex surface of the deflection from above down and in, and from below up and in, manipulating the obtuse angle surface to a vertical septum with a horizontal spur, formed by the approximation of the two thicknesses of the septum. This projection is then removed at the second sitting.

8. **Adhesions Connecting the Eustachian Tube to the Pharyngeal Wall above,** by Dr. R. C. MYLES of New York.

The author reported two cases where he had found changes in the lateral and superior pharyngeal wall. The fossa of Rosenmüller was converted into a number of cavities by adhesions extending from the Eustachian tube to the basilar process. There were some ear symptoms present and others referable to congestion of the base of the brain. The adhesions were torn with the finger under cocaine with the subsequent relief of the symptoms.

Dr. NICHOLS of New York demonstrated a self-retaining operating electric speculum for the ear.

In the afternoon of the same day a general meeting of the Congress was held under the direction of this Society. Dr. CLARENCE J. BLAKE of Boston, delivered a most interesting and scholarly address on **Otology in its Relations to General Medicine.** After describing the foundation and the development of otology as a special branch of medicine, the speaker drew attention to the importance of a proper care of the nose and pharynx during the acute exanthemata. School children should be examined more carefully for deafness, and when this defect exists compensatory advantages should be afforded. Systematic examination of the ears of the children in deaf-mute institutions would show a much greater degree of partial hearing than was formerly supposed, and suggest methods of training in particular directions with greater prospects of general improvement. Owing to the complicated anatomy of the temporal bone and its intricate relations, surgery of the ear belongs with right to the aural specialist. The close relation of otology to general medicine is especially marked in that group of affections commonly called the chronic catarrhal inflammation of the middle ear. It is due mainly to otology that that peculiar symptom, vertigo, has received a better explanation. We now differentiate between *aural* and *auditory* vertigo. The " fatigue of deafness " is a condition from which many deaf people suffer, through the increased demands made upon their faculties to keep in communication with the outside world ; this condition should never be lost sight of by the otologist and the general practitioner. The speaker in closing urged the establishment of obligatory courses in otology at our medical schools, and more opportunities for the graduate student to continue the study of the ear.

REPORT ON THE PROGRESS OF OTOLOGY IN THE FIRST QUARTER OF THE YEAR 1897.

BY DR. ARTHUR HARTMANN.

Translated by Dr. CHARLES ZIMMERMANN, Milwaukee, Wis.

ANATOMY OF THE EAR.

1. GRUBER, Jos., Prof. Remarks on the canalis caroticus, with reference to practical otology. *Monatsschr. f. Ohrenheilk.*, No. 1, 1897.

1. The curvature of the canalis caroticus of the petrous bone varies even in children in regard to the radius and the lumen at different points, but it is more marked in adults. In consequence of a greater bent, the portion of the osseous canal which projects into the tympanic cavity becomes more prominent, and makes the tympanic cavity more narrow. In very marked cases the canalis caroticus may almost cover the whole promontorium. Retracted drumheads may become adherent to it in such cases, and in paracentesis it might be injured. Such a condition may also cause pulsating and other subjective noises. KILLIAN.

PHYSIOLOGY OF THE EAR.

2. GELLÉ. Preservation of hearing in anchylosis of the stapes. *Arch. internat. de laryng., d'otol.*, x., 1.

3. EWALD, R. Contribution to the physiology of the labyrinth. Fifth communication : The relation of the labyrinthine tonus to rigor mortis and on the order in which the various muscles become subject to rigor mortis according to Nysten *Pflueger's Archiv*, vol. lxiii., p. 521.

4. BEZOLD, FR., Prof. The place of consonants in the scale. These ARCHIVES, Germ. Edition, vol. xxx., p. 114.

5. STEIN, L. WILLIAM. Demonstration of an apparatus to produce a continuous and uniform alteration of pitch of the tones. (With an appendix : A new air-pump for acoustic experiments.) *Verhandl. der Physikal. Gesellschaft.*, Berlin, sixteenth year, No. 4, p. 42.

2. GELLÉ thinks the theory of v. Helmholtz erroneous, that the mobility of the plate of the stapes is the chief condition under which oscillations of sound may be transmitted from the chain of the ossicles to the labyrinth. He reasons thus : As in some experiments a thin plate, which is fixated with its whole periphery, transmits oscillations of sound, and as in anchylosis of the stapes no complete deafness ensues, the mobility is not necessary for the conduction of sound. It is rather a protective arrangement enabling one to fixate the plate voluntarily through the two intrinsic muscles in loud noises and to weaken the hearing. (Valsalva's experiment, centripetal pressions, swallowing while the nose is closed.) The transmittance of sound occurs only by molecular vibrations, for which the chief requirement is that the plate be very thin.

From this late discovery G. concludes that complete deafness is not simply due to anchylosis of the stapes. Therefore its detachment can be of no avail. ZIMMERMANN.

3. EWALD found the labyrinth to exert an influence upon rigor mortis by observing a different condition of the muscles, after the death of the animal, according to their nervous communications with the labyrinth. In some of his pigeons and rabbits rigor mortis set in earlier after removal of the labyrinth. In the great majority of cases the phenomenon could *not* be ascertained in pigeons. In the rabbit even a post mortal mechanical irritation of the labyrinth (destruction) or a post mortal electric irritation influences the rigor.

After removal of the labyrinth motor disturbances act on the muscles of the skeleton in the following succession : The muscles of the eye, of mastication, of the nape of the neck, larynx, arms, chest, abdomen, legs. This corresponds with Nysten's order of occurrence of rigor mortis in the various muscles.

Willgerodt, on the suggestion of Ewald, found that the order of Nysten commences with the ocular muscles. Ewald reports in this article the methods of W. Ewald attributes the cause of

Nysten's order and the retarded onset of rigor mortis after resection of nerves to the more or less developed labyrinthine tonus.

ASHER.

5. STEIN demonstrates an apparatus the working of which is the following: A tone can be changed in pitch, while sounding, by continuous and voluntary retardation of its vibrations. The velocity of the alteration may be uniform and the pitch arrived at may be read at any time. The sonorous instrument is a bottle, the air of which is set in vibration. It is tuned for a certain note by pouring in mercury, and it communicates with a peculiarly shaped vessel, the "variator." The level of both vessels is simultaneously altered by a cylinder with a piston. The pitch depends upon the level. The peculiar form of the variator is due to the fact that the velocity of the change of level in the bottle must gradually decrease, to produce a uniform velocity of the change of tone. The beats (Schwebungen) caused by the co-existence of the tone of the apparatus and the tone of another instrument may serve to determine the number of vibrations of the latter, as the moment in which the beats cease may be easily ascertained.

MISCELLANEOUS.

a. STATISTICS AND REPORTS.

6. BARNICK, O. Report of Prof. Habermann's clinic for ear, nose, and throat patients at the University of Graz, from October 1, 1894, to December 31, 1895. *Arch. f. Ohrenheilk.*, vol. xlii., p. 96.

7. STETTER, Prof. Observations on diseases of the ear, nose, and throat. VIII. Jahresbericht. *Monatsschr. f. Ohrenheilk.*, No. 3, 1897.

8. ALT, FERDINAND, Dr. Casuistics. *Monatsschrift für Ohrenheilk.*, No. 3, 1897.

6. Aside from the usual statistics, 2 cases of necrosis of the auricle, and a case of pyæmia due to phlebitis of the sinus after acute purulent otitis media are reported. Of 20 radical operations, 10 were performed for cholesteatoma, 10 for caries *without* cholesteatoma. Habermann also aims at a retroauricular closure of wound.

BLOCH.

7. STETTER mentions a case, in which unskilled manipulations in the ear canal for removal of inspissated cerumen had caused otitis externa with abscess on the squama of the temporal bone.

S. is rather conservative in regard to radical operations after he saw a number of cases, operated on by others, not recover. He makes a mistake, however, if he considers Wilde's incision sufficient in cases, in which the opening of the mastoid process is indicated, if there is no fistula or apparent affection of the bone.

KILLIAN.

8. Report of a case of probably alcoholic neuritis of the auditory nerve as partial symptom of alcoholic polyneuritis with affection of the optic nerve. A case of sclerosis of the middle ear, in which the hearing was improved, and unbearable subjective sufferings relieved by artificial perforation of *Mt.* The perforation remained patent, after injections of liquid vaseline *per tubam*, had been made for some time, which had produced a slight otorrhœa. Finally ALT speaks on the closure of old perforations by application of liquid trichloracetic acid on the margin of the perforation, every fourth day, by means of a probe. A. thus obtained complete closure after 3 to 15 cauterizations, and sometimes improvement of hearing. Perforations of Shrapnell's membrane at the posterior superior quadrant and very large perforations involving almost the whole *Mt* are not fit for this mode of treatment. KILLIAN.

b. GENERAL PATHOLOGY OF THE EAR.

9. MINOR, JAMES L. Complication of mumps with aural diseases, with report of eight cases. *New York Med. Jour.*, March 27, 1897.

10. CROCKETT, E. A. Acute syphilitic affection of the ear. *Boston Med. and Surg. Jour.*, Feb. 11, 1897.

MINOR has collected the notes of eight cases, six of which were seen by himself and two more unreported cases of another physician. He finds that the left ear was affected in five, the right in one, and both ears in two cases. In the eight cases, both parotid glands were involved. In no case was the testicle affected. From a study of these eight cases, it will be seen that the trouble began and ended in the middle ear, in three cases; in one case, the inflammation began in the middle ear and extended to the inner ear; in three cases, the seat of the disease was in the labyrinth, the cochlea alone being involved; while in one case, the writer thought the disease had its origin in the semicircular canals, and subsequently extended to the middle ear and cochlea. Minor concludes by saying that, "if these cases were promptly and intelligently treated, instead of being consigned at once to the category of incurable affections, a large proportion of them would doubtless recover their hearing." GORHAM BACON.

CROCKETT believes that syphilitic affections of the ear are much more frequent than is generally supposed. He reports three cases from among fifteen or twenty observed.

The first case was that of a man, forty years of age, with no previous ear trouble, but who had syphilis about six months previously. He never received any treatment. Three weeks before Crockett saw him, he began to have ringing in the ears, and deafness which became very complete; also some vertigo, so that his gait was unsteady in walking.

Watch: right, $\frac{c}{60} = 0$ —; left, $\frac{c}{60} = 0$ —

Voice: right, $\frac{1}{65}$ —; left, $\frac{1}{45}$ —.

Tuning-fork, C, 512 v. s.: right, $\frac{8''}{0}$ $\frac{\text{a. c.}}{\text{b. c.}}$; left, $\frac{12''}{0}$ $\frac{\text{a. c.}}{\text{b. c.}}$

Upper limit: right, Galton, 2.9; left, Galton. 2.6.

Lower limit: 64 v. s.; heard with both ears.

The tinnitus and vertigo were at this time very marked.

The second case was that of a man, twenty-eight years of age, who had syphilis three years before. The deafness came on suddenly and was extreme, with severe vertigo and vomiting. Tinnitus like a sea-shell in his ears. He staggered to the left in walking. The disease seemed to be limited to the auditory nerve.

The third case was that of a man, thirty-five years old, who had syphilis six months previously and who had been under careful treatment. Deafness came on suddenly, accompanied by violent vertigo and tinnitus, until in the course of two or three days he became very deaf and could not attend to his business. Drumheads clear and in normal position, and tuning-fork and other tests showed that the seat of the trouble was in the auditory nerve.

These cases all had a marked similarity of symptoms—very sudden and severe deafness, more or less severe vertigo, and violent tinnitus occurring in persons previously free from ear trouble. In all the cases, the watch and voice deafness was very marked, and a tuning-fork of the middle register was wholly lost to bone-conduction but remained fair for air-conduction. At the same time, the upper register, as shown on the Galton whistle, was more or less diminished, and the lower limit usually remained unaltered. This hearing test, according to Crockett, is quite characteristic of syphilis and he says, "that the clinical evidence would seem to be in favor of an effusion into the labyrinth," as a cause of this particular group of symptoms. In the majority of cases observed by the writer, a diagnosis of cranial trouble had been made, and consequently an unfavorable prognosis was given. This complication of syphilis frequently comes on in cases that have received careful and thorough treatment. This was especially so in the third case. Under these circumstances, the subcutaneous administration of pilocarpine up to its full physiological limit will be of great service. Great improvement in hearing and diminution of vertigo follows the administration of this drug in acute cases.

The writer concludes by saying that pilocarpine is an absolute specific in all acute syphilitic cases presenting the previously described symptoms ; that where the deafness and vertigo have persisted for over a month, the prognosis is very doubtful ; that it is of great value in cases where iodide and mercury are of little avail ; but that it has no permanent value, and should be used in conjunction with other anti-syphilitic treatment.

GORHAM BACON.

c. GENERAL THERAPEUTICS.

11. **FORNS.** On the puncture of the round window with following aspiration as a mode of treating affections of the labyrinth. *Ann. des mal. de l'or., du lar.*, etc., March, 1897.

12. **HORNE, JOBSON, and YEARSLEY, MACLEOD.** Eucaine as a local anæsthetic in the surgery of the throat, nose, and ear. *British Med. Journ.*, Jan. 16, 1897.

11. **FORNS** proves that the method published by Botey (these ARCHIVES, Germ. Ed., xxx., 2) is based on erroneous anatomical conceptions, aside from its clinical admissibility. F. shows on specimens and pictures that certainly the vestibular ends of the membranous cochlear whorls are destroyed and peri- and endo-lymph evacuated, if, according to Botey, the needle is pushed in upwards and forwards. It must be introduced forwards and then downwards, if only perilymph is looked for. This requires an especially fine canula with a director that has two bents, one for each ear. This operation can, according to F., hardly be executed, the technique being too difficult, as a deviation of a few tenths of millimetres has to be avoided, which can scarcely be controlled. ZIMMERMANN.

12. **HORNE and YEARSLEY,** after a certain amount of experience of eucaine, find that eight per cent. is the most reliable strength for operative measures. Although taking longer than cocaine to

produce anæsthesia (five to ten minutes,) they think its action is equal to it, and has the advantage of producing little if any toxic or after-effects. The anæsthesia produced lasts from fifteen to twenty minutes. One great drawback of its use in nasal surgery appears to be its inability to produce thorough contraction of the turbinal bodies. It will be of great use in children if on thorough examination it fulfils expectations.

ARTHUR CHEATLE.

d. DEAF-MUTISM.

13. KREBS, G. Aural and nasal examinations in the deaf and dumb asylum of Hildesheim. *Arch. f. Ohrenheilk.*, vol. xlii., p. 119.

13. One third almost of the 93 inmates suffers from considerable affections of the nose and pharynx, chiefly hyperplasia of the lymphatic ring, recognized by the teachers through *rhinolalia clausa.* In older pupils the high palate and the abnormal position of the teeth were the unmistakable signs of the former. Other authors found even a higher percentage of adenoid vegetations, up to 60 % and 70 %. K., expected some result from Urbantschitsch's hearing exercises in 5 cases. Finally he postulates the appointment of a physician with sufficient otological and rhinological knowledge for each deaf and dumb institute.

BLOCH.

INSTRUMENTS AND METHODS OF EXAMINATION.

14. SELIGMANN, H. D., Frankfurt a. M. On periodic changes of air in the external meatus. *Monatsschr. f. Ohrenheilk.*, No. 1, 1897.

15. MOUNIER. A new method of removing the wall of the attic. *Arch. internat. de laryng., d'otol.*, vol. xx., 1.

16. STACKE. On the employment of the electromotor in operations, especially of the nose and ear. *Arch. f. Ohrenheilk.*, vol. xlii., p. 81.

17. FREUDENTHAL, W., New York. A nose bag. *Arch. f. Laryngol.*, iv., 2.

14. By means of this rarefactor of SELIGMANN, driven by accumulators, the air of the external meatus can be rarefied 120 to 1000 times. Experiments made by S. for three years in cases of anchylosis of the stapes stopped the subjective hearing sensations for a longer or shorter time, but did not effect an improvement

of hearing. In rare cases the former disappeared entirely. S. recommends his instrument also for the treatment of adhesions and remnants of acute otitis media. KILLIAN.

15. MOUNIER devised an instrument similar to Hartmann's for the removal of the lateral wall of the attic without detachment of the auricle A movable chisel is fastened to a protector—similar to that of Stacke, but with its inner end bent at a right angle—in such a manner, that it can act only parallel to the horizontal part of the protector. Although only small portions of bone can thus be removed, which requires more time, the after-treatment is shortened. M. recommends his method in cases of caries limited to the lateral wall of the attic, and for the removal of the stapes, if the meatus is not stenosed. The operation requires the best illumination possible. ZIMMERMANN.

16. STACKE only mentions operations in the nose, opening of the accessory cavities, and treatment of deviations of the septum. Of aural operations, he only advocates scraping (with the electromotor) the internal surface of the tympanic cavity "as far as possible into healthy bone" in cholesteatoma. S. considers this method as the least dangerous. BLOCH.

17. Two small ice-bags of india-rubber are connected through a small bridge of india-rubber, which are fastened on the nose by a strap. They are useful in epistaxis, filled with ice. Acute coryza is relieved by their application after being filled with warm water. ZARNIKO.

EXTERNAL EAR.

18. OLIVER, THOMAS. Double hæmatoma auris. *British Med. Journ.*, Jan. 9, 1897.

19. HESSLER. Ceruminal plugs of the meatus. *Arch. f. Ohrenheilk.*, vol. xli., p. 176 ; and vol. xlii., p. 1.

20. DENKER, A. A case of fracture of the anterior inferior wall of the meatus through violence acting on the lower jaw. *Ibid.*, vol. xlii., p. 31.

21. BLOCH, E., Dr., Freiburg. The diagnosis of perforations of the *Mt.* These ARCHIVES, German Edition, xxx., p. 121.

18. OLIVER'S patient was an alcoholic anæmic woman, aged thirty-six years, who was struck violently on each ear one week before admission to the Royal Infirmary, Newcastle-upon-Tyne. On admission, both auricles was very much swollen, especially the

right; the swellings, bluish in color, with shiny, irregular surfaces, being the size of large walnuts. Examination of the blood showed deficiency of red blood corpuscles, 2,800,000 in 1 *cmm.*

ARTHUR CHEATLE.

19. HESSLER found such plugs in one half per cent. of his cases, and describes sixty-seven, according to occurrence, etiology, symptoms, and course, diagnosis, prognosis, and treatment. They extend the meatus, push the *Mt* inwards, lead to atrophy of the bones, occasionally with all the symptoms of a cholesteatoma breaking into the cranial cavity. The treatment, of course, is, as a rule, more simple and the prognosis more favorable than in cholesteatoma of the middle ear. BLOCH.

20. The deeper portions of the ear were not injured.

BLOCH.

BOOK REVIEWS.

The Year-Book of Treatment for 1897. A Critical Review for Practitioners of Medicine and Surgery. Crown octavo, 488 pages. Cloth, $1.50. Lea Brothers & Co., Philadelphia and New York, 1897.

This excellent manual deserves all praise. The year's progress in the various branches of practical medicine is reviewed in twenty-five chapters by recognized English authorities. The practitioner is thus enabled to keep abreast with the advance and the literature of any one or more departments of medicine with a minimum of time, and the advantages of a specialist's critique. The chapter on the "Diseases of the Ear" is by G. P. Field, M.R.C.S., and the "Diseases of the Nose and Throat" are treated by St. Clair Thompson, M.D., etc. Both chapters are excellently written; the subject matter is presented in a clear, connected, if not exhaustive manner. In the present day of progress and great literary activity in medicine, books of this character are almost a necessity, and none fulfil the want better than this Year-Book. Its small size and moderate price are not unimportant points in its favor. A. H. K.

MISCELLANEOUS NOTES.

Dr. STACKE, of Erfurt, has received the title of Professor.

Professor PRUSSAK, whose name is connected with various anatomical structures in the middle ear, died at St. Petersburg in his fifty-eighth year.

The following is a list of the officers in the Section of Otology and Laryngology for the Meeting of the British Medical Association, to be held in Montreal from August 31 to September 3, 1897: President: G. MACDONALD, M.D., London; Vice-Presidents: W. TOBIN, M.D., Halifax; H. S. BIRKETT, M.D., Montreal; G. K. MCDONAGH, M.D., Toronto; Honorary Secretaries: A. CHRETIEN, M.D., Montreal; H. D. HAMILTON, M.D., Montreal; W. PERMEWAN, M.D., Liverpool.

TILLY HERBERT, M.D., B.S., has been appointed Surgeon to the London Throat Hospital, Great Portland Street, London.

We regret to have to announce the death of Mr. LEOPOLD HUDSON, Aural Surgeon to the Middlesex Hospital, London, at the early age of thirty-four.

EDITORIAL NOTICE.

By an oversight of the binder, Text-plate I., illustrating Dr. A. L. Turner's paper, has been omitted in some copies. Those of our subscribers who possess defective copies will receive the plate on application to G. P. Putnam's Sons, 27 West 23d Street, New York. It should face page 144 of this volume.

EDITOR.

Contents of the latest numbers of the Zeitsch. für Ohrenh.

Vol. XXX., No. 3. Issued May, 1897.

11. Re-examination of deaf-mutes, by F. Bezold.

12–13. Translation of Milligan's articles.

14. The literature of chloroma, by O. Körner. (Translated in this number.)

15. Respiratory closure of the lateral sinus, by O. Körner. (In this number.)

16. Mr. Downie's paper.

17. On the shape of the ear, by Dr. Karutz.

18. The after treatment of the operative exposure of the middle-ear spaces, by L. Grünwald.

Vol. XXX., No. 4. Issued June, 1897.

19. Two cases of pyæmia, by H. Eulenstein.

20. Ear affections in acute and chronic Bright's disease, by J. Morf.

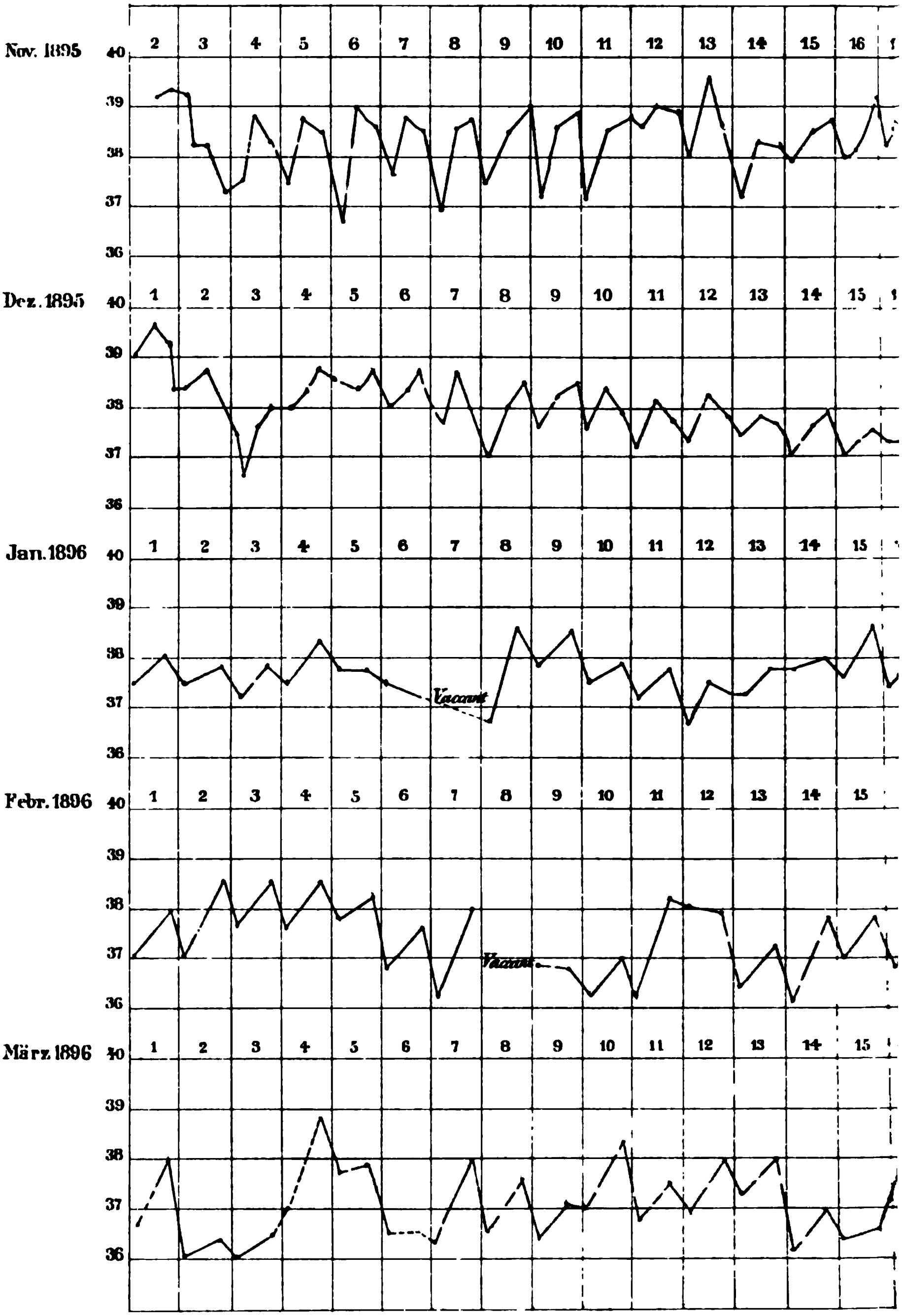
21. On the shape of the ear (concluded), by Dr. Karutz.

22. Dr. Bacon's paper.

23. On mild cases of middle-ear tuberculosis, etc., by A. Scheibe.

24. On the relation between the shape of the skull, the vault of the palate, and the hyperplasia of the pharyngeal tonsil, by W. Scheibe.

Report on the progress in otology during the first quarter of 1897, by A. Hartmann.



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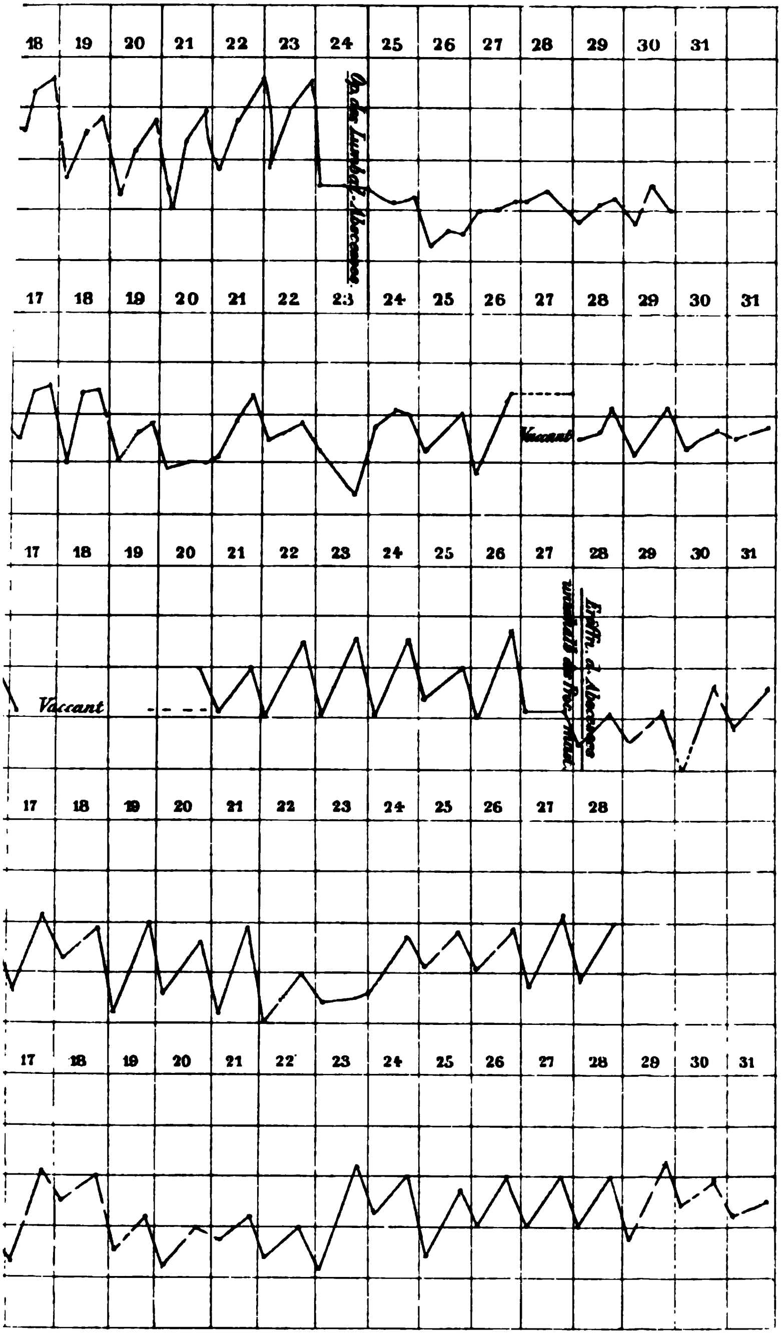

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VOL. XXVI. No. 4.

ARCHIVES OF OTOLOGY.

THE CENTRAL ACOUSTIC TRACT AND ITS INVOLVEMENT BY TUMORS OF THE MID-BRAIN, ESPECIALLY OF THE CORPORA QUADRIGEMINA AND THE TEGMENTUM (*Continued*).

By Prof. F. SIEBENMANN, Bâle.

Translated by Dr. Arnold H. Knapp, New York.

5.—ELEVEN CASES OF QUADRIGEMINAL (TEGMENTAL) TUMORS WITH CONSECUTIVE DEAFNESS. (Abridged translation.)

DEAFNESS occurs as a symptom of a quadrigeminal tumor in twenty of our cases, *i.e.*, about 34.5 %. In this number are included seventeen of the forty-eight cases of combined involvement of the pineal body and the corpora quadrigemina, and three of the ten cases of tumors limited to the pineal body. If the rare cases of cortical deafness be disregarded, no lesion in any other region of the brain is so frequently accompanied with deafness as are the tumors of the mid-brain. Bernhardt noted eight cases of deafness in thirty cases of tumors of the pons, while Delbanco found deafness eleven times in forty-six cases; together we have nineteen cases of deafness in seventy-six, about 25 %. In tumors of the cerebellum, according to Bernhardt, the number is smaller, about 20 %, while deafness in affections of other parts of the brain is much rarer.

The selection of permissible cases for our statistics was not so simple as might seem. We first rejected all cases of external and middle-ear disease. Of the remaining, we could only make use of those where (1) the deafness coincided with or immediately preceded a symptom referable to the brain tumor, and where (2) the deafness showed a marked progressive character. Consequently we have been forced to exclude from our twenty cases of deafness in quadrigeminal affections nine cases where the time of onset of the deafness was not stated, and the progressiveness of the deafness was not proven.

ELEVEN CASES OF DEAFNESS OF PROGRESSIVE CHARACTER AND COINCIDENT WITH THE BRAIN-AFFECTION.

1. WAGNER (4), female, twenty-seven years old. Duration of sickness, four and one-half months. Increasing deafness from third month on. At first, occasional attacks of syncope, preceded by tinnitus and spasms in the extremities. After attacks, patient is often deaf for several hours ; complete deafness after the fourth month. Neuritis optica, later atrophy and blindness. Delirious at times.

Autopsy.—Corpora quadrigemina indistinguishable. The tumor, a resistant, fibrous tubercle, extends from the corpora quadrigemina into the depth of the pons. The latter contains two small apoplectic foci, otherwise normal ; corpus striatum and optic thalamus normal.

2. KLEBS-FISCHEL (10), male, twenty-two years. Duration, seven months. The left ear became deaf six months after beginning of disease. A month later complete deafness on right side. Blindness. Eyes converge. Argyll-Robertson pupil. Ptosis. Tremor, ataxia. Vomiting. Headache. Excited. Suicidal tendency.

Autopsy.—4–6 *cm* large glioma of quadrigeminal region, of both crura, and the post. cerebellum. Metastases in floor of fourth ventricle.

3. GOWERS (11), male, twenty-four years. Duration about two months. A month after beginning, complete deafness within eighteen days. Choked disc, optic neuritis, diminished vision. Stupor.

Autopsy.—A sarcoma between the healthy optic thalami, above the crura and in front of the superior corpora quadrigemina, which are likewise involved. Pineal body has disappeared ; the left lower corpus quadrigeminum is flattened, the right is normal. The dorsal layer of the tegmentum of both crura is affected in the lateral portion. The tumor sinks somewhat into the Sylvian aqueduct. The trunks of the eighth nerves are normal, but the sixth nerves are compressed.

4. Hope (22), male, eighteen and one-half years. Duration of sickness six months. After three months marked deafness in right side. Left, hearing somewhat diminished. Tuning-fork placed on skull is perceived in left ear. Two weeks later, increasing deafness left, though deafness does not become complete on either side. Optic neuritis, diminished sight. Argyll-Robertson pupil. Ocular motility up and down restricted. Paresis of vagus and spinal accessory. Tremor. Convulsions. Apathetic.

Autopsy.—A tumor (sarcoma telang.) as large as a pigeon's egg occupies the quadrigeminal area, and compresses the optic thalami. Sylvian aqueduct remains in the posterior half, the anterior part is destroyed. Left posterior corpus quadrigeminum present though swollen, and its brachium is broadened. The roots of the second cervical nerve are contained in a sclerosed area.

5. Gauderer–Steinbrügge (24), male, twelve years. Duration, two months. R. otitis ext. L. drum-membrane opaque. Watch heard only contact R; L. in several centimetres (normal 10 *m.*) Tuning-fork a′ not perceived from the forehead, but from each mastoid process. Optic neuritis with deficient sight. Myosis; pupils do not react. Sensibility is reduced, later hyperæsthesia. Ataxia. Speech retarded. Stupor.

Autopsy.—A tumor (teratoma) of the size of a walnut, of the pineal body with extensive erosion of both median surfaces of the optic thalami and of the left tegmental region. The vena magna Galeni is compressed. The acoustic nerves contain microscopical blood extravasations; free blood corpuscles are found in the tissue of the modiolus. Reissner's membrane is pressed down upon Corti's organ. Membrane of round window is convex externally. The tympanum shows traces of previous inflammation.

6. Christ–Siebenmann (26), male, eighteen years. Duration, twenty months. Five months after commencement, tinnitus in both ears. Hearing gradually failed and in one month conversational voice heard indistinctly close to ear. Tuning-fork A placed on skull is not perceived. Rinné positive. Perceived portion of tone-series, Galton $\begin{smallmatrix}\text{r.} & 1.8\\ \text{b.} & 2.1\end{smallmatrix} - A_1$. Continued decreasing power of hearing, though deafness did not become complete. No bone-conduction. Air-conduction: R, a^4–A; L, a^3–a^2. Drum membrane normal. Optic neuritis, later atrophy with failure of sight. Total ext. ophthalmoplegia except int. and ext. recti.

Paralysis of accommodation, and pupils were immobile. Paralysis of vagus and spinal accessory. Ataxia. Speech retarded. Apathy. Romberg's symptom.

Autopsy.—Glio-sarcoma of pineal body, of the quadrig. plate of the tegmentum up to the limit of the pes, of the post. region of the third ventricle involving the posterior half of the right optic thalamus. Ant. part of cerebellum involved. Primary acoustic centres normal (Christ). Both auditory nerves, labyrinth, and tympanum were found normal macroscopically and microscopically (Siebenmann).

7. WEINLAND (35), male, twenty-five years. Duration, two years. Twenty months after onset the hearing on the right side was worse than on the left, and this condition progressed. Optic neuritis ; atrophy with diminished vision. Mydriasis ; difference in size of pupils. Ataxia ; epileptic attacks ; slow speech, amnesia ; Romberg.

Autopsy.—A glioma occupies the left half of the quadrig. plate as large as a walnut. Pressure-atrophy of the vermiform process. Cerebellum pressed into the vertebral canal. Lateral fillet in the left quadrigeminal area is wanting, distinctly degenerated in the proximal part of the pons. The left ant. and post. corp. quadrigemina are hardly recognizable. Central tegmental tract and post. longitudinal bundle are atrophic from pressure, crura normal. Round-cell infiltration of the peripheral layers of the acoustic trunks.

8. BESOLD, I. (42), female, sixteen years. Duration, twenty months. One and a half years after commencement hearing failed, and deafness was absolute in six months. At later stages, optic atrophy and blindness were noted. Anosmia ; pain in the extremities ; ataxia ; speech monotonous and slow. Dementia.

Autopsy.—Medullary sarcoma of posterior part of the left optic thalamus, of the entire quadrigeminal plate and of the left crus, projecting into the fourth ventricle and slightly invading the contiguous parts of the cerebellum. Olfactory bulbs compressed and atrophic.

9. BESOLD, II. (43), female, eleven years. Duration, two and three-quarter years. Six months after beginning of sickness, marked diminution of hearing in the course of one month. Separation of the cranial sutures was accompanied with transient improvement in hearing, and amelioration of the other symptoms. Later the hearing grew worse, and during the last two months

patient was deaf and dumb. Choked disc, atrophy, and blindness. Ocular muscles showed disturbance of coördination. Contraction of the extremities. Reflexes increased; epileptiform attacks. Dementia. Intention tremor. Polyphagia.

Autopsy.—Angio-sarcoma of both optic thalami, of the entire quadrigeminal plate, and of the pineal gland, occupying the third and fourth ventricles. The floor of the fourth ventricle as well as the cerebellar peduncles are intact. Sylvian aqueduct destroyed. The internal part of the cerebellar peduncles and the internal capsule are affected on both sides; also the left nucleus lenticularis. In the cord, distinct secondary degeneration found in the posterior columns and in Gowers's tract in the cervical region.

10. DALY (z.8), twenty-three years, male. Duration, seven months. In the last two to three months gradual deafness Choked disc, later blindness. Tonic convulsions. Ataxia. Epileptiform attacks. Transient disturbance of speech. Dementia. Polyphagia.

Autopsy.—From the place of the pineal body, a circumscribed tumor (alveolar sarcoma) extends for a distance of 5.2 *cm* backward between cerebrum and cerebellum; it is 4.5 *cm* broad. The tumor presses on the surrounding structures; the corp. quadrigemina appear softened and flattened.

11. ZENNER (z.10), male, thirteen years. Duration, ten months. Two months after beginning, deafness set in. Optic neuritis; blindness; transient paralysis of deglutition. Contracture of some of the extremities. Convulsions. Ataxia. Epileptiform attacks; progressive indistinctness of speech. Dementia.

Autopsy.—A glioma, slightly adherent to the ependyma, is situated in the ventricles, occupying about an equal space on each side. The tumor is soft and contains a considerable quantity of brain sand; it measures $3\frac{1}{4}$–$4\frac{1}{2}$ *cm.* The auditory nerves appear normal.

We cannot exactly determine the percentage of deafness in tumors of the quadrigeminal region from this group of eleven definite cases of deafness in affections of the mid-brain, on account of the nine cases which we had to exclude from lack of data, and which unquestionably contained some cases belonging to the above group. If we disregard these nine cases entirely we get a relation of 11 : 49 = 22.5 %; if we add the nine cases the relation is 20 : 58 = 34 %. Wieland found 9: 18 = 50 % which cannot be correct as that author did not make use of all the material obtainable.

It is very important to notice that in *not one of these eleven cases was the process found localized to the quadrigeminal plate.* The pontine tegmentum was partly destroyed in case 1. The crural tegmentum was involved in cases 2–8. In cases 9–10 we have only the inexact statement of pressure on the corpora quadrigemina, or on the medulla and pons and their surroundings. In regard to Weinland's case, on which he bases the existence of a quadrigeminal deafness, it is noteworthy that the microscopical examination showed an extensive lesion in the crural tegmentum and the brachium of the posterior corpora quadrigemina, which are regions through which the central acoustic tract passes, but do not in a restricted sense belong to the quadrigeminal plate. The other affected parts of the brain were: Pons (apoplectic areas), case 1; cerebellum and floor of the fourth ventricle, case 2; erosion of the splenium and optic thalamus, case 5; cerebellum and optic thalamus, cases 6 and 8; optic chiasm, case 5; cerebellar peduncles, internal capsule, and lenticular nucleus, case 9. The auditory trunks were found normal in cases 3, 4, 6, and 11, and slightly involved in cases 5 and 7.

In all cases of deafness in connection with affections of the mid-brain we find either compression or actual destruction of the tegmentum (or of the internal capsule) present. The cases where the affection has been limited to the quadrigeminal plate, seem to be ten in number. *In all of these comparatively uncomplicated cases of tumors of the corpora quadrigemina the hearing was found to be normal.*

The cases of Passow and Curschmann are of interest as bearing on this point. The first case was that of a patient with symptoms of fairly typical affection of the corpora quadrigemina. At autopsy the corpora quadrigemina were found totally destroyed, though before death the hearing on one side was perfect and on the other there was an affection of the bone and probably panotitis. In Curschmann's case the hearing was normal: the post-mortem examination showed a cerebellar tumor which had almost completely eroded the corpora quadrigemina from pressure. All of these cases prove that an affection, limited to the quadrigeminal plate produces no deafness. The same fact has been observed in the few observations of hemorrhagic foci in the quadrigeminal region. It cannot be proven from our statistics that a lesion of the tegmentum, due to a tumor, must be accompanied by deafness. Some anatomical and clinical observations have even shown that extensive central changes in the tegmentum may be entirely negative in this respect. We must not however forget that in extensive destruction of the tegmentum the presence of deafness may have been overlooked from one or the other cause (deficient or reduced intellect of patient, or insufficient examination).

A very interesting fact, to which Weinland has already drawn attention, is that in those cases where deafness was noted during life and post-mortem examination showed a degeneration of the lateral fillet, the deafness was only or chiefly on the opposite side. Exceptions to this seem to be the cases of Hope and Mohr, where the deafness corresponded with the side of the most extensive lesion in the mid-brain. On the whole, however, clinical observations confirm the opinion of the anatomists, that the fibres of the central acoustic tract, for the greater part, decussate in the region between the corpora quadrigemina and the labyrinth. It may be possible that individual variations between the number of crossed and uncrossed fibres exist, or that the presence of retrograde decussation in the quadrigeminal area, as has been demonstrated by Held and Weinland, helps to explain the symptoms in the above two cases.

Gowers was the first to advance the possibility of deafness in tumors of the quadrigeminal region to be due to a lesion in the dorsal parts of the crural tegmentum.

In our group of 11 cases, internal hydrocephalus was noted in 10, and in 5 of them to a marked degree; the cerebral convolutions were flattened in 7. This pathological change has suggested that increased intracranial pressure may cause changes in the acoustic nerve and its function as it does in the case of the optic nerve. Moos especially made this an object of research though without arriving at any definite conclusions. Steinbrügge explains the depression of Reissner's membrane and bulging of the round window in the case of Steinbrügge-Gauderer as being the result of increased pressure transmitted from the extradural space to the scala tympani. This explanation of Steinbrügge has not been accepted, as the changes described by him may occur in normal cochleas and may be caused by the technical steps preparatory to the microscopic examination.

Aside from the fact that the deafness in all the cases can be explained by a lesion of the tegmentum, it is noteworthy that of the twelve cases with extensive hydrocephalus internus, only five (42 %) showed deafness, while among the group of cases of deafness, hydrocephalus internus occurred in 91 %. This is unusually large, and is about one-half greater than the percentage (65.5) in the collection of all of our tumors. This disproportion is explainable, because, in the group of deaf cases, tubercular tumors, which rarely are associated with internal hydrocephalus, are only represented by one, and the rapidly growing sarcomas, gliosarcomas, and gliomas, which early exert compression on the vena magna Galeni, are very frequent. In the collection of all tumors, the tubercles are very numerous.

The interesting observation of Besold, that after spontaneous dilatation of the skull the hearing improved for a length of time, shows that intracranial pressure has some influence on the function of the auditory nerve.

The onset, course, and duration of the brain symptoms in our group of cases is as follows: The first symptom is usually headache accompanied by vomiting, diminution of vision, periods of excitation, or a short apoplectic attack. In Hope's case convulsions appeared at the start; in Weinland's, cerebellar ataxia was the first symptom. The following symptoms followed in order of frequency.

Affections of the optic nerve.............	11	cases.	100 %
Headache..............................	11	"	100 %
Vomiting..............................	9	"	91 %
Dysarthria............................	8	"	73 %
Disturbance in ocular motility...........	8	"	73 %

Of which: paralyses of ocular muscles, 6.

Disturbance of co-ordination......... 2.

Ataxia	7	cases.	64 %
Epileptiform attacks	7	"	64 %
Disturbances in motility of trunk and extremities	6	"	55 %
Facial paralysis	5	"	45 %
Incontinency	4	"	36 %
Disturbances of tendon- and muscle-reflexes	4	"	36 %
Paralysis of deglutition	3	"	27 %
Elevation of temperature	3	"	27 %
Disturbances in sensibility of trunk and extremities	2	"	18 %
Polyphagia	2	"	18 %
Vertigo	0	"	0 %

These symptoms correspond nearly in frequency with the symptoms of all the cases taken together. Disturbances in speech and in the function of the optic nerve, however, seem to be more frequent in the smaller group. Vertigo (on lying down) is absent in all cases, though it seems to appear as part of the symptom-complex of ataxia.

The duration of the affection varied from two months to two and three-fourths years.

6.—SYMPTOMATOLOGY OF PROGRESSIVE DEAFNESS DUE TO A LESION IN THE TEGMENTUM.

a. *Onset, course, and duration.*

The clinical picture of the deafness appears rather late in the course of the disease, usually from three to six months after the onset of the brain affection. In one case deafness appeared in one month, in two cases not until the eighteenth to twentieth month. As these tumors undoubtedly all originated in the pineal body, then extended to the corpora quadrigemina, and later invaded the deeper-placed structures, the relatively late onset of deafness may, consequently, be regarded as another proof for the supposition that the corpora quadrigemina contain no auditory centre.

Deafness commencing only in one ear is noted in only three cases.

Except for the case of Weinland, where the history is rather uncertain, we always find deafness on both sides in the course of the disease. The progress of the deafness varies in rapidity; in general it is proportional to the progress of the disease.

Accompanying subjective noises are rare (two cases) and appeared only in the beginning.

The final stage in the diminution of hearing is usually (82.7 %) complete bilateral deafness.

1. Total bilateral deafness for the voice.......54.5 } 82.7 %
2. Nearly total bilateral deafness for the voice. 18.2 }
3. High-grade bilateral deafness for loud voice...... 27.3 %

In group three are included the cases where the lesion in the tegmentum was not so extensive.

Deafness was bilateral in all of our cases, because the pathological process was sufficiently extensive to destroy both sides of the tegmentum. This of course only applies to the cases where the tumor started from the pineal body, *i. e.*, in the middle line.

b. *Results of the functional examination.*

Freund, with justice, says that we can make the diagnosis of an affection of the sound-perceiving apparatus only when our clinical observation is supported by a post-mortem examination. The former must consider not only the symptoms of disease of the auditory nerve, but of the entire nervous system; the latter must include the macroscopic and microscopic examination of the organ of hearing. The examination for disease of the auditory nerve consists of the following steps:

1 and 2. Examination of air-conduction with the voice and the continuous tone-series, to determine the hearing distance and the perceived portion of the scale.

3 and 4. Examination of bone-conduction (according to Weber and Schwabach) and comparison with air-conduction (Rinné).

Of course the functional examination can only be regarded as characteristic for the pathological state of the nerve and the labyrinth, when no disease of the sound-conducting apparatus is present; when the functional examination is undertaken in a case of central disturbance, disease of the labyrinth (and of the auditory trunk) must in addition be excluded, only in that case are we entitled to make use of the examination in a differential diagnostic manner.

Among our eleven cases of crural tegmentum-deafness, the case of Christ-Siebenmann is the only one to fulfil all of the above five conditions; in fact, I have been unable to find in the entire literature a case of clear central disturbance of hearing where the examination was complete in the above particulars. In the cases which came to autopsy the determination of the portion of the scale perceived through the air has been wanting.

The latter objection holds true for the case of Steinbrügge-Gauderer: in the middle ear on one side were found the residua of a previous inflammation; in the other ear there was an otitis externa. The post-mortem examination of the temporal bones is wanting in the remaining nine cases of our group; air-conduction was examined only with the voice, though in the case of Steinbrügge-Gauderer also with the watch.

In regard to the results of the tuning-fork tests we can only discuss the case of Christ-Siebenmann; though in the three cases where the bone-conduction was tested it was found markedly diminished or even wanting. In Hope's case the tuning-fork placed on the vertex was perceived by the better ear, while in the case of Christ the result was uncertain. Weber's experiment must therefore be considered unreliable.

I was able in Christ's case to determine the tones-limits at various times, both at the onset and at the end. A progressive contraction of the perceived portion of the tone-series was present in both ears. The contraction took place from the upper as well as from the lower limit. It was very interesting and possibly of pathognomonic value to observe that at the beginning the patient heard with the better ear all tones from Galton 1.8 (normal 1.5) to A_{-1} without interruption; F_{-1} and all deeper tones on the other hand were not heard. At the upper limit an entire tone was wanting, and at the lower end more than one and one-half octaves. The contraction then progressed both from the upper and the lower limit, and the hearing was reduced to the tones at about the normal middle.

In the central disturbance of hearing depending upon a lesion of the crural tegmentum, the perception of the lower tones is first affected, later the perception of all tones of the scale is equally diminished.

It was observed that in my patient at the beginning the tuning-fork a′ was perceived by bone-conduction for a much shorter time, while Rinné's experiment in the absence of all middle-ear affection was much shortened (7 or 5 instead of 15–20″). This, I think, is explained by the unusual force necessary to cause the tuning-fork to vibrate, which caused it to be transmitted from the mastoid process through the air. Considering the enormously shortened Schwabach, which appeared in the early stages of the disease, we must have recourse to the evidently purely clinical observation of Politzer, that in deafness due to a brain tumor the watch and acoumeter are perceived normally by bone-conduction, and only are wanting when the deafness has become very pronounced.

It is an interesting question whether the reflexes, such as starting, deviation of the eyes, turning of the head, winking, etc., caused by the hearing of unexpected noises, appear even when the cortical tract in the region of the anterior corpora quadrigemina is interrupted and the patient is deaf. According to Goltz and Munk, these reflexes are never absent in dogs deprived of their cerebral lobes. Our patients have not been examined specially in this direction. These examinations are apt to be without success, because the patients are usually in a markedly apathetic condition from an early stage.

The relation between crural tegmentum-deafness and deaf-mutism is but little understood. According to Mygind (*Deaf-mutism*, 1894) changes found in the central organ of deaf-mutes were limited to the brain, cerebellum, and the medulla oblongata. No mention is made of the corpora quadrigemina, or the crura. The only probable tumors are gummas and tubercles as the others lead to a rapid death. Isolated cases of acute nuclear disease of the mid-brain are known, in which deafness or deaf-mutism remained. I have observed one of those cases.

In a second case of nuclear oculo-motor palsy with deafness, running a chronic course, which I saw together with Drs. Ranch and Hosch, the process was evidently of a syphilitic nature, and an energetic mercurial treatment caused marked amelioration of the symptoms. At all events post-mortem examination of deaf-mutes, especially with ocular paralysis and ataxia during life, should include the tegmental region of the mid-brain.

7.—DIAGNOSIS OF DEAFNESS PRODUCED BY A TUMOR OF THE CRURAL TEGMENTUM.

This diagnosis coincides with that of a tumor of the quadrigeminal or crural-tegmental region which has extended to the neighboring parts of the tegmentum.

In all of the eleven cases we find:

1. Failure of vision. This is a symptom of the direct lesion of the optic nerve, which usually precedes any noticeable change in the nerve (choked disc (?), optic neuritis). The latter appears late but is never wanting. The first signs of atrophy usually appear after three to four months. No mention is made in our histories of the presence of the hemianopic pupillary reaction without hemianopsia, which Knies considers characteristic for disease of the quadrigeminal region.

2. Disturbed innervation of the inner and outer ocular muscles occurs in most of the cases; it is rarely limited to the inner muscles. Bilateral paralyses of muscles with the same name appear characteristic for nuclear affections, as the nuclei of the two sides adjoin. In addition we find loss of convergence-reaction, disturbance of the associated movements of the lateral deviators, paralysis or spasm of accommodation.

3. Ataxia, uncertain gait, are present in ⅓ of the cases. According to our group the patients suffering from ataxia also show symptoms of ophthalmoplegia.

4. Tremor, clonic and tonic spasm without loss of consciousness, occur in about ⅓ of the cases.

5. Facial paralysis is almost as frequent.

6. Paralysis and anæsthesia of the extremities rarely accompany the symptoms of tegmental deafness. Among the general symptoms are headaches of no particular localization, vomiting, scanning mode of speech, epileptiform attacks, exaggerated tendon reflexes. The pulse is variable, sometimes slow, at other times rapid.

The diagnosis was made with considerable certainty in ¾ of the cases from the atactic gait with ophthalmoplegia (disturbance of accommodation and co-ordination) and the above named general symptoms pointing to a tumor complicated with progressive deafness. In Krafft–Ebing's case there was no deafness but tinnitus and a combination of hemiataxia with oculo-motor paralysis of the other side; ataxia on movement, that form of intention-tremor, seems to be characteristic.

Tumors in the neighboring parts of the brain seem exceptionally to cause similar symptoms. For instance the cases of Bruns and Giese; in the former the tumor was situated in the inferior vermiform process, in the latter the posterior end of the corpus callosum. Deafness however was wanting in both. We know that cerebellar tumors often produce deafness, but in those cases we are aided in the diagnosis by the following considerations: (1) the tumor often destroys the auditory nerve trunk; (2) at the same time the facial nerve is involved; and (3) all of its branches are paralyzed. This is however not always correct as, Bernhardt has shown (p. 213) in his collection of cerebellar tumors; thus in the cases complicated with paralysis of the ocular muscles one must especially investigate the kind of ocular paralysis, whether bilateral or isolated and whether the entire nerve or only isolated nuclear fibres corresponding to the nuclei are involved. The functional examination of the hearing in the beginning of the disease cannot at the present day be said to determine whether the trunk or the central tract is involved. No examination has been undertaken during the first stage of such an auditory paralysis, and verified by the later post-mortem examination. Examination during a lateral stage, as I have before mentioned, does not furnish results which are distinguishable from those of an advanced affection of the labyrinth or crural tegmentum. On long observation it is at least not difficult to distinguish between the tumors and an affection of the mid-brain, which is mainly localized to the nuclei as the poliencephalitis superior of Wernicke, a form of progressive ophthalmoplegia which after a long duration resembles in its clinical picture the tumors of the quadrigeminal region, with oculo-motor and trochlear paralysis, optic atrophy, ataxia, tremor, and exaggeration of the knee-jerk. So far as I have been able to go over the literature, it has been impossible to find progressive deafness in any of the cases. The points in differential diagnosis given by Wernicke and Böttger-Hitzig are, in brief, absence of choked disc, though white atrophy has been observed. Intellectual and psychical disturbances are present from the beginning, and though in most cases of tumor, stupor and a slowing of speech exist, in the poliencephalitis chronica superior there is rather a tendency to garrulousness which resembles the senile dementia according to Böttger. Reinhold's supposition, that convulsions are always absent in poliencephalitis, does not hold true for Böttger's case. Abducent paralysis is more frequent in poliencephalitis than in mid-brain tumors; this is even more pronounced for the bulbar symptoms, which seem to be almost typical for the later stages of the poliencephalitis superior.

The possibility of tabes must not be overlooked in the examination, from the combination of paralyses the ocular muscles and deafness, as two cases of Marina-Morpurgo show, and with the accompanying ataxia many resemble at first view the picture of a tumor of the quadrigeminal region.

Ilberg has described a case of gumma of the mid-brain or of the tegmentum, with paralyses of the ocular muscles, ataxia, and deafness. This is, however, a rare localization of syphilis. Basal processes are much more frequent and may produce these symptoms; according to Uhthoff, gummata occur fairly often in the intrapeduncular space and produce paralysis of the ocular muscles which occasionally are bilateral and resemble central disturbance. This form of ophthalmoplegia, which, up to Uhthoff's publication, was regarded as a nuclear affection, is characterized by loss of accommodation and pupillary reaction; isolated mydriasis is often a clue in the diagnosis. Ataxia is rather rare and then usually of special origin bordering on tabes; Uhthoff found changes in the disc in 40 %. The same author found the auditory nerve rather frequently involved in these cases of syphilitic ophthalmoplegia; the trunk was usually affected and not the cerebral portion. In a similar case which I observed, interior and exterior peripheral oculo-motor paralysis, progressive deafness, and some ataxia were present. In the beginning of the disease I noted a relatively decided diminution for the high tones of the Galton whistle with preservation of the perception for the lower tones, which is in striking contrast with the result of my first examination of the hearing in the tegmental tumor (case of Christ-Siebenmann). A second similar case of syphilitic disease of the auditory trunk has convinced me that too great weight cannot be attached to the result of the determination of the tone-limits (in a differential diagnostic view), as in this case, notwithstanding the failure of hearing, the perception of the upper part of the scale remained at about the normal height.

For a complete index of the literature, see the German edition, vol. xxix., p. 88-91.

PATHOLOGICAL CHANGES OF THE MIDDLE EAR IN MEASLES. REPORT OF EIGHTEEN AUTOPSIES.

By OSWALD RUDOLPH, MÜNCHEN.

WITH A SUMMARY BY PROF. BEZOLD,[1] MÜNCHEN.

Abridged translation by ADOLPH O. PFINGST, M.D., Louisville, Ky.

IT has been my privilege, during an active service as assistant to the Royal Ear Clinic of München, to study a large number of cases of middle-ear disease occurring during an attack of measles. The examinations were not limited to those cases in which the ear complication was evidenced by an otorrhœa, but extended over a large number of children confined in the Royal Children's Hospital with measles, without subjective symptoms in many, but where inspection of the drum-membrane showed evidence of middle-ear affection. This paper will treat only of the fatal cases; the post-mortem examinations of which were made by Prof. Bezold and myself.

The incentive to my work was a series of cases of measles reported, in 1887, by Tobeitz. He divided his cases according to their clinical course into

1. Those which ran an uncomplicated course (33 in number).

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[1] The contents of this paper represent the careful work of my late assistant, extending over a period of a number of years. Handicapped by ill health, the author was deprived of the pleasure of arranging for publication the valuable material gathered by him before his untimely death. Out of respect for his memory I have taken it upon myself to publish the result of his researches which I will do with but slight alterations. I will conclude the same with a brief summary of the experience gained by myself in the observation of these cases of otitis complicating measles, both as regards the clinical features and the pathological changes occurring in the ear. BEZOLD.

2. Complicated cases that terminated in recovery (40 in number).

3. Fatal cases (22 in number).

In speaking of the second group, in which the middle-ear complication was apparent (otorrhœa) in but sixteen cases, Tobeitz expressed the belief that the number would have exceeded this by far if the drum-membrane of every child—with and without subjective symptoms denoting ear complication—had been carefully examined. Out of the twenty-two fatal cases (group 3) all but three revealed positive signs of middle-ear complication. Seventeen of this number were dissected, and showed marked changes in the middle ear, while of the five in which no autopsy was performed one was complicated with otorrhœa and another with severe pain in the ear.

In order to study the changes in the ear during the different stages of measles, we have arranged our cases according to the time intervening between the eruption and the fatal termination, beginning with those of the shortest period. Where but one of the temporal bones could be obtained we selected that one in which the inflammatory process had been least marked, as evidenced by the examination during life. Of the following sixteen cases there were two in which both bones were examined. They are included in the following, making a total of eighteen.

CASE 1.—J. K., eight years old; death on third day after beginning of eruption from diphtheria, descending croup, pneumonia, and pleurisy. *Autopsy.*—Croup of the naso-pharynx extending into pharyngeal opening of tube on the *right side.* The rest of cartilaginous tube normal. Bony part of tube filled with muco-pus. The tympanum showed a greenish muco-pus on its floor, and between the malleus and incus, while the mucous membrane was red and slightly swollen. The antrum was empty.

CASE 2.—K. M., three years and nine months. Death on third day. *Autopsy.*—Extensive lobular pneumonia. The entire middle ear and antrum of *right side*, including the mastoid cells and the osseous portion of the tube filled with a muco-purulent fluid. The mucous membrane injected and swollen. Drum-membrane normal.

On the *left side* the cartilaginous portion of tube normal, the osseous portion filled with tenacious muco-pus. Outside of a minute amount of mucus in the niche of the fenestra ovalis and injection of the mucous membrane, the tympanum is normal. Mastoid cells empty and normal.

CASE 3.—F. W., eleven months; death three days after eruption. *Autopsy.*—Croupous pneumonia of right lobe of lung; pleuritis; tubercular bronchial glands. The pharyngeal opening of the tube on *left side* slightly injected. The tympanic cavity and antrum filled with pus. Swelling and redness of the mucous membrane of tympanum, and to a slight extent of the antrum.

CASE 4.—J. D., four years; death on fourth day. *Autopsy.*—Croupous laryngitis and tracheitis; catarrhal pneumonia of both lower lobes; cheesy degeneration of bronchial glands. A diphtheritic deposit at pharyngeal opening of *right* tube, cartilaginous portion of which contains two slight extravasations of blood; otherwise normal. The osseous tube slightly injected. Dura mater over the antrum thickened with a sero-sanguineous infiltration. The tympanic cavity filled with a sero-purulent fluid, the mucous membrane being swollen and covered by a fibrinous deposit.

CASE 5.—R. W., one year and three months; death on fourth day after eruption. *Autopsy.*—Lobular pneumonia. The cartilaginous portion of the tube on *left side* normal; the mucous membrane in the osseous portion swollen. Tympanic cavity full of yellowish-green pus, in parts tenacious mucus. Mucous membrane infiltrated with a serous fluid.

CASE 6.—G. K., three and a half years; fatal termination six days after beginning of eruption. *Autopsy.*—Pharyngeal diphtheria. Cartilaginous tube of *left side* about normal; osseous portion near the tympanum filled with tenacious cloudy mucus. The mucous membrane healthy. The tympanic cavity and antrum normal.

CASE 7.—B. A., two and a half years; period of six days between eruption and death. *Autopsy.*—Lobular and lobar pneumonia; sero-fibrinous pleurisy. The cartilaginous tube hyperæmic at the pharyngeal opening, otherwise normal; the bony tube filled with sero-purulent fluid, and its mucous membrane swollen and red. Tympanum and antrum filled with a sero-purulent fluid. Hyperæmia of the mucous membrane, especially in posterior portion of antrum, where there is some granulation tissue.

CASE 8.—E. A., eleven months old; death on ninth day. *Autopsy.*—Lobar and lobular pneumonia. The *left* Eustachian tube normal in its entire extent. Tympanum and antrum filled with creamy pus, which is readily washed away; slight swelling and injection of the mucous membrane.

CASE 9.—B. M., three years; nine days between eruption and death. *Autopsy.*—Lobar and lobular pneumonia; croup of larynx and trachea. A muco-purulent deposit throughout the cartilaginous tube (*left side*), and at tympanic extremity of the osseous portion. A deposit of a similar character in tympanum and antrum. The mucous membrane at the floor of the tympanic cavity swollen, also around the ossicles.

CASE 10.—D. B., nine months; death on tenth day after eruption. *Autopsy.*—Lobar and lobular pneumonia; muco-purulent bronchitis. The Eustachian tube of *right side*, except for some swelling in the osseous portion, normal. Creamy pus almost fills the tympanum and antrum. The mucous membrane of these cavities, as well as some adjacent mastoid cells, discolored and slightly swollen.

CASE 11.—E. R., one year and three months; period of fourteen days between the eruption and fatal termination. *Autopsy* Lobar and lobular pneumonia; recent sero-fibrinous pleurisy. The *left* Eustachian tube shows slight redness and swelling of the mucous membrane. The antrum and tympanum full of pus and the mucous membrane swollen and hyperæmic.

CASE 12.—L. M., two years and three months; death on seventeenth day. *Autopsy.*—Faucial diphtheria; lobular pneumonia; tubercular bronchial glands. The right cartilaginous tube contains glassy mucus, the osseous portion a small amount of muco-pus. Tympanum and antrum filled with sero-purulent fluid; the mucous membrane discolored and considerably swollen. In the antrum, the inner wall of the tympanum and on the drum, a fibrinous exudate. Some of the mastoid cells filled with their pus.

CASE 13.—R. J., one year and three months; death on twenty-fifth day. *Autopsy.*—Lobular pneumonia. The entire Eustachian tube on *right side*, filled with a muco-purulent exudate. Fluid of the same character fills the tympanic cavity and antrum. The mucous membrane very much swollen and injected.

CASE 14.—V. K., nine years; death on twenty-fifth day. *Autopsy.*—Broncho-pneumonia; purulent bronchitis: pleurisy; laryngeal diphtheria. The *left* middle-ear filled with pus. Slight swelling and hyperæmia of the mucous membrane. The deposit in the antrum has a fibrinous character.

On the *right side* the pharyngeal opening of the tube closed with adenoid tissue. The cartilaginous portion is collapsed, the osseous portion shows areas of hyperæmia. Tympanum and antrum full of pus, the latter containing a small pseudo-membrane on its posterior wall. The mucous membrane but slightly swollen; a medium-sized cell in the mastoid contains pus.

CASE 15. J. J., four years and nine months; fatal termination twenty-five days after beginning of eruption. *Autopsy.*—Croupous pneumonia; fibrinous pleurisy; diphtheria of fauces, larynx, and trachea. The *right* Eustachian tube shows only grayish-red discoloration of the mucous membrane. The tympanum, antrum, and mastoid cells opening into the antrum contain flocculent (fibrinous) pus. Some injection of the mucous membrane and slight swelling.

CASE 16.—B. E., two years; intervening period of thirty-three days, between eruption and death. *Autopsy.*—Diphtheritic laryngitis; inflammation of glands of neck; phlegmonous inflammation of submaxillary glands; purulent bronchitis and broncho-pneumonia; collapse of right upper lobe of lung. The cartilaginous tube on *right side* is normal; the osseous canal swollen and hyperæmic near the tympanum. Thick pus fills the entire middle ear. The mucous membrane swollen, especially in the tympanic cavity.

Opinions differ as to the cause of the middle-ear complication in measles. Wagenhäuser (*Archiv f. Ohrenheilk.*, vol. xxvii., p. 166) expressed the view that the inflammation extends along the Eustachian tube and in support of the theory called attention to the frequency of nasal complication in these cases of otitis. Tobeitz, on the other hand, believed the disease of the ear to originate independently, the same as the eruption, as the disease of the respiratory and digestive tract and conjunctiva, and not to be due to an extension of the inflammation by continuity.

In looking over our cases in an endeavor to solve the question, we notice that in the first five cases (six temporal bones) the period between the eruption and death did not exceed three to four days, but that the cavities of the middle ear were nevertheless filled with an exudate—the drums being intact. This, along with the fact that the upper part of the cartilaginous tube was always normal, makes us incline toward the view expressed by Tobeitz, that the middle-ear affection was a primary trouble.

Our examinations have further shown that extensive involvement of the middle ear may be present with but slight changes in the drum-membrane. The course of otitis following measles is usually a mild one. In Case 16, although thirty-three days intervened between the eruption and death, the drum-membrane was still intact. The individuals affected seldom have a rise of temperature or complain of pain. The aspect of the drum, which in otitis from other causes indicates the severity of the attack, is not reliable in otitis of measles, as the variability in the pathological changes found at the autopsies shows.

The drum-membrane does, however, undergo changes in measles, which are fairly constant. It loses its lustre and takes on a livid white or bluish-gray color, while the surface appears slightly wrinkled. The reflex becomes dim, or is lost. The epidermis of the drum not infrequently peels off, hiding, as it hangs to the epidermis of the ear canal, the malleus. These changes in the appearance of the drum are so constant that their presence after measles indicates, almost with certainty, extensive complication of the tympanum. It is possible, on account of the slow course of the otitis following measles, for the otorrhœa to begin some time after the eruption. We have frequently seen that the discharge first commenced five or six weeks after the eruption.

SUMMARY, BY PROF. BEZOLD.

In collecting the above material it was our aim to continue in the line of research followed by Tobeitz. That author found morbid processes in the ear after measles, of such striking character as to lead him to the assertion that the middle ear is affected in every case of this disease. To assure ourselves of the authenticity of this statement, we examined the middle ear of a number of fatal cases of measles, irrespective of the cause of death, and took the precaution of selecting the organ of that side which the examination during life had led us to believe was least affected. Our cases, in consequence, include no severe destructive processes, as we usually find in scarlet-fever and occasionally in measles. In the only case among our number (Case 10) which was marked by destruction of the drum, otorrhœa had existed previous to the exanthematous disease, and was consequently an independent condition. Notwithstanding our selection of less severe cases,—with the single exception mentioned—we found evidence of an active suppuration of the middle ear in every instance. In one of the cases (No. 6) the deposit of muco-pus was limited to the Eustachian tube, and appeared to have been forced into it from the naso-pharynx just before death. A relative immunity of the mucous membrane of the tympanum may have existed in this instance, the individual having gone through a previous attack of measles, which prevented its involvement during the second attack. In all of our other cases the tympanum contained pus or muco-pus.

A bacteriological examination of the exudation, made at the time of a paracentesis, or after death, showed the streptococcus to be present in most cases, sometimes almost in pure culture. The staphylococcus pyogenes albus was present, but less frequently than the streptococcus, while the staphylococcus pyogenes aureus was only exceptionally found. One or several of the pyogenic species were always present.

Redness and swelling of the mucous membrane of the affected parts was observed as early as the third day; according to Tobeitz, as early as the first day after beginning of the eruption. The cavities were at the same time usually filled with pus. As early as the third or fourth day a fibrinous exudate may have formed and ecchymotic spots be present in the mucous membrane. In four to six days small polypoid granulation tissue was sometimes seen in the osseous portion of the tube, tympanum, and antrum.

It is the exception for the otitis of measles to lead to spontaneous perforation of the drum-membrane. A noticeable feature of our cases was the comparatively slight swelling of the mucous membrane, so pronounced in otitis from other causes. Hyperæmia was also not pronounced, appearing in some cases in patches, while destruction of the mucous membrane, with consequent exposure of bone, did not take place in a single case. A slight necrosis of the mucous membrane in one case finds its explanation in an otorrhœa which had existed before the exanthematous fever.

The slight pathological changes in the otitis of measles in comparison to purulent otitis of other origin is due according to some authors to a less virulent character of the infectious element, and according to others to a local diminution of resistant power occurring simultaneously with a reduced state of the entire organism during the height of the constitutional disease. As the exudate in otitis from different causes has been found to contain about the same species of micro-organisms, the first theory will hardly bear consideration. The theory of diminished resistant power receives support in the protracted course of the otitis in measles. The following case may briefly be cited as an instance of the diminished vitality of the body at about the height of the attack of measles.

R. C., six years old, was examined on October 8, 1895; two weeks ago, had passed through an attack of measles and bronchitis; began complaining of pain in his right ear on October 5, 1895. This was followed on the next day by a discharge from the ear, fever, and inclination of the head toward the affected side. The red and excoriated drum had a perforation in the upper and posterior segment. The left drum was normal. On October 11th, owing to continued elevation of temperature (38.6°), to congestion of the optic disc, and swelling and tenderness—especially on deep pressure—over the mastoid, the antrum was opened. The periosteum was retracted from the bone above and below the temporal ridge, laying bare an area of about one and one half square inches. The mastoid cells—which were small and numerous—were mostly normal, but one or two contained pus. The antrum contained an exudate composed of pus and fibrin on its posterior wall.

The case ran a peculiar course in that the temperature did not return to normal until the ninth day after the operation, and that the wound in the bone showed little tendency to heal.

Eighteen days after the operation the wound at its upper angle still gaped, exposing white bone. From about that time the bone slowly granulated. The wound did not entirely close until December 3d.

Notwithstanding the otherwise normal course of this case, the bone showed no tendency to granulate until after the eighteenth day. I have observed a similar indisposition of the bared bone to regenerate after opening mastoid abscesses occurring in the course of scarlet-fever, typhoid, pyæmia, and phthisis. This slow repair of the tissue can be accounted for only in a diminished vitality of the tissues during the course of the febrile troubles mentioned.

Applying the theory to the otitis following measles, the protracted course of these cases can best be explained as follows: The swelling and injection of the mucous membrane not having reached the proportions at the height of the fever which they are wont to do in simple purulent otitis, increase in the following weeks under the influence of convalescence, and often reach such proportions as to lead to spontaneous perforation of the drum.

Other observers who have studied the pathological changes in the ear following measles are Habermann (Schwartze's textbook, vol. i., p. 261) and Siebenmann. Habermann examined seven auditory organs of four cases, and in each instance found the mucous membrane of the middle ear inflamed, often ecchymotic, and always covered with mucopus. Streptococci were found in the exudate in each instance, usually in association with the staphylococcus pyogenes aureus. Siebenmann, whose researches were not published, dissected the temporal bone of four children who had succumbed to measles, and Dr. Morf, his assistant, of two additional ones—in all of which the middle ear contained pus.

We have been able to collect this comparatively large number of post-mortem examinations of middle-ear affections, during measles, and there is not an instance on record, in which the ear was found normal after death from measles.

This would justify the supposition, that this form of otitis is an integral lesion of this constitutional disease, the same as conjunctivitis, rhinitis, pharyngitis, and bronchitis. The frequent involvement of the accessory sinuses of the nose can be accounted for in the same way.

In regard to the origin of the disease in the ear, I can but uphold the view suggested by Rudolph. The comparatively normal condition of the Eustachian tube, even in the early stages, makes the theory of propagation along this channel highly improbable.

The entire nature of the affection of the mucous membrane of the middle ear, viz., the variability in extent of the process, the punctate character of the hyperæmia, the ecchymotic spots, and the appearance of small granulations, shows such striking resemblance to the process in the skin that the inference of their analogous character seems justifiable.

In conclusion, a word about the prognosis of these cases, as to the final condition of the hearing, may be of interest. In my examinations of 1807 school children, the history of a previous attack of measles could be elicited from the parents in fifty-two instances. The percentage of cases with defective hearing was not greater in these fifty-two than in the remaining number. In the majority of instances the pus which appears in the middle ear in measles causes no symptoms, and is entirely reabsorbed without leaving any sequelæ.

Besides the features mentioned in our cases, two other pathological conditions were noted.

First.—The lymphatic glands at the anterior border of the sterno-cleido-mastoid muscle near its origin were invariably enlarged. In one case they had broken down, and pus had found its way into the naso-pharynx, just below the opening of the tube.

Second.—Hypertrophy of the pharyngeal tonsil, was always more or less marked. The adenoid tissue usually spread over the entire opening of the tube and the surrounding parts. On the surface it showed punctate hyperæmic areas and small ecchymosed spots. This condition supports the view of the authors, who consider the acute infectious diseases in early youth and especially measles a factor in the development of adenoid vegetations.

Third.—I have examined the anterior wall of the external auditory canal in every case up to the fourth year of life. My observations confirm those of Zuckerkandl, in that the outer edge of the bony auditory canal is formed in the second to third year, and the apertures disappear in the third year.

NOTES ON THE PATHOLOGY OF INTRACRANIAL COMPLICATIONS IN EAR-DISEASE.

By Dr W. KÜMMEL, Breslau.

Translated and abstracted by Dr. Edwin M. Cox, New York.

I FEEL justified in presenting the following series of cases of ear disease, with intracranial complications, on account of their interest, although all, except one, ended fatally, even when the focus of disease was reached and removed. During the last few years, unsuccessful cases, and those not operated upon, have not often got into the literature, and this is unfortunate, for such cases are usually instructive. I have described here only those cases which I myself have closely observed and in which I myself have made the post-mortem examinations.

Case i.—External Abscess after Recurrent Otitis Media—Operative Exposure of Posterior Fossa—Recovery.

Man, aged sixty-one. Always well until April, 1895, except for a period of two months, eight years ago, when he had a painful affection of the liver. In April, 1895, he had an acute suppurative otitis media, and paracentesis of the drum membrane was performed. The pus was evacuated and the perforation soon healed but pain in the ear and temporal region began and continued. The paracentesis was repeated four times, with the same result each time. An opening made with the cautery in the drum membrane also healed promptly.

In August, 1895, I found the left drum membrane decidedly reddened, the malleus still clearly defined, and no exudate discernible. The mastoid was neither swollen nor tender, except the region of the emissary veins, which was very painful on palpation. Percussion revealed no difference from the healthy side. The outer half of the left optic papilla was decidedly redder and more obscure than the inner half.

I could not decide to open the mastoid in view of the symptoms; there was no fever, no change in the pulse, no vertigo, and no disturbance of gait. However, I made a free radial incision in the drum membrane in its lower posterior quadrant, and saw the patient again in two days. He was worse. His gait was unsteady and hesitating, but not swaying even with the eyes closed, and no tendency to turn to either side. No nystagmus. The drum membrane very red, the auditory canal freely open, and no sign of any substance coming from the tympanic cavity. Moderate swelling and tenderness behind the mastoid, but no redness of the skin. Percussion gave a flatter resonance over the left mastoid than over the right. The sound of a c tuning-fork, placed on the vertex, was appreciated by auscultation decidedly less over and behind the left mastoid than on the right; the patient hears it on the left. No fever, pulse about 100, no stiffness in the neck muscles.

This case is somewhat perplexing. Considering the well-marked, though ill-defined general symptoms, and the absence of any trouble anywhere else in the body, we must, in spite of the absence of fever, think of an extensive trouble in the temporal bone. The continuation of inflammation in the drum-membrane, although without the formation of exudate, made me think that the disease must be in the epitympanic recess, or the antrum. The disturbance in the gait and the pain in movements of the head suggested the possibility of trouble in the posterior fossa. The swelling behind the mastoid, and the diminished conduction of the tuning-fork, with the change in the percussion sound, also confirmed this view. My diagnosis, therefore, was one of suppuration in the antrum or epitympanic recess, perhaps also with an extradural abscess in the posterior fossa.

I decided upon operation and performed the usual one upon the mastoid. Nothing found in the diploë. An unusual position of the lateral sinus made the approach to the antrum difficult, and when it was reached it was found full of granulation tissue. In the floor of the antrum was a small opening leading towards the median line. To get enough exposure it was necessary to remove part of the posterior surface of the petrous portion, and the dura was thus exposed internal to the sigmoid sinus and between the latter and the jugular fossa. At a great depth, I found a pretty extensive cavity in the bone, and at once pus followed. On account of the depth of the wound and the bleeding, further work was impossible, so having assured myself that all the pus was evacuated, I packed the wound throughout with iodoform gauze. I could see that the epitympanic recess was free from granulations, and the dura itself seemed nearly normal. The patient improved steadily, and was out of bed in three days. In eight days the drum membrane had lost its congestion, though some dulness of appearance and moderate retraction persisted. Auditory acuteness about one third less than on the other side.

How the pus reached the posterior surface of the petrous portion is difficult to say. I have come to the conclusion that the abscess was an empyema of the saccus endolymphaticus, as has been recently described by Jansen. I examined every chiselled fragment, and am sure that there was no piece of a semicircular canal removed. It is possible that the aqueductus vestibuli was opened near the saccus endolymphaticus, or that, as above indicated, the pus came through a semicircular canal. It is remarkable that the sigmoid fossa was not involved in spite of its intimate vascular connection with the antrum. This can be accounted for by the sclerosis of the bone. An original labyrinthine suppuration in this case I believe exceedingly improbable. Under these circumstances, I could not decide to open the vestibule, and I believe that the result justifies me.

The intermitting flow of pus from the ear is noteworthy. I believe that the continual attacks of pain and discharge depended not on recurrences of the original trouble in the tympanic cavity, but upon an inflammation accompanying the process in the antrum and becoming worse from time to time. The pus may have come from the epidural abscess. Such an intermitting flow of pus from the tympanic cavity, depending upon suppuration in the antrum or in the bone, is very seldom observed.

CASE 2.—Double Abscess of the Temporal Lobe after Repeated Operation upon the Mastoid Following Acute Otitis Media—Evacuation of One Abscess—Death.

Patient, a girl of three, always well until, during the course of a recent eruptive disease, she had an attack of middle-ear inflammation with involvement of the mastoid for which she was operated upon February 27th. In the middle of July another abscess formed under the skin of the mastoid, and another operation was done. Three weeks afterwards repeated vomiting began and the general condition became worse ; convulsive movements first of the left side, and later of the whole body, occurred in one instance, lasting all night. On August 26th the child came under my charge ; the history up to this point was given me by her physician. When I saw the child she was deeply comatose, groaned and cried out occasionally, made frequent movements with the head and extremities, and did not respond to peripheral stimulation. Pupillary reaction good, some spastic extension of the right wrist and two ulnar fingers of the right hand. Muscular strength fairly well maintained. No cough, no opisthotonos. The mastoid fistula still discharged pus. Some tenderness on pressure in the right parietal region and behind the mastoid. Temperature 37.°9 C.

Lumbar puncture yielded no fluid, and the operation was at once proceeded with. A wide flap was made, exposing the whole mastoid region, and the bone freely removed. The lateral sinus did not pulsate. The posterior bony wall of the auditory canal was removed, and the membranous part split. The antrum, recessus epitympanicus, and the tympanum were full of granulation tissue, which was removed, and the malleus and incus were extracted. After this the opening in the tegmen tympani was freely enlarged, and an incision made in the dura which was much thickened. No fluid escaped, the brain did not pulsate, and showed no tendency to prolapse. A test-puncture showed, at a depth of 3 *cm* in an upward and backward direction, somewhat towards the middle line, the presence of thick green pus which was not foul. The abscess, about the size of a pigeon's egg, was then opened by incision, and a drainage-tube was introduced ; the rest of the wound was packed throughout with iodoform gauze. An incision was made previously into the lateral sinus, and fluid blood was found. Next day the condition of the child was unsatisfactory.

August 29th.—Another incision into the sinus evacuated some brownish thrombus masses. A cerebellar puncture gave clear yellow fluid. Pulse very small. Death occurred the same afternoon.

At the autopsy, the dural sac was found to contain a little, almost clear fluid, the convolutions were somewhat flattened, and there was no sign of meningitis. A transverse incision through both hemispheres just behind the beginning of the Sylvian fissure opened a second abscess entirely posterior to the end of the drainage tube. The first abscess had not collapsed, but contained no pus. The second abscess was full of pus and was larger than the first. The walls of both cavities were dense and unyielding. The lateral sinus in the neighborhood was full of thrombus, and the tympanum showed the changes made by the operative work. The descending horn of the lateral ventricle was empty and compressed anteriorly. The other ventricular cavities contained clear serum.

Microscopically, the walls of both abscesses showed approximately three layers: first, an inner layer formed of numerous round cells held together by thread-like fibres; second, a layer of thick, glistening connective tissue arranged chiefly in bundles, and stained deeply red by Van Gieson's stain; and third, a layer of demarkation-tissue exceedingly rich in round cells, but not specially characteristic. The ependyma of the descending horn of the lateral ventricle was absent where the wall of the ventricle approached most closely to the abscess cavity. Weigert's stain showed numerous long chains of streptococci in the inmost part of the abscess wall of the unevacuated abscess; in the empty cavity they were fewer and frequently enclosed in round cells. The other layers contained no bacteria. The septum between the two cavities was from 1.5 to 2 *mm* thick.

It is not improbable that, with a correct diagnosis early in the case, the second abscess cavity would have been found, and there would have been a chance of recovery. It is probable that in this case the formation of the septum was secondary in an abscess originally having one cavity. The process of encapsulation in this case is very marked. From the history it may be inferred that the encapsulation resulted in at most seven months, probably in a shorter time. The microscopical examination confirms the experience that, notwithstanding the incapsulation, the abscess enlarged at the periphery and showed a beginning perforation into the ventricular cavity. The encapsulation of the abscess made the diagnosis more difficult; the density of the wall of the cavity made me think that the wall of the ventricle was before me, and made me cautious of going farther. The marked pressure symptoms indicated the possibility of another abscess, and perhaps should have encouraged me to look for it by further exploration.

(*To be continued.*)

CHRONIC OTITIS MEDIA PURULENTA—ABSCESS IN THE TEMPORO-SPHENOIDAL LOBE, FOLLOWED BY PURULENT LEPTOMENINGITIS—OPERATION—DEATH.

By A. BARKAN, M.D., San Francisco.

THE history of this case is written with the writer's earnest desire that, although perhaps deficient in details, and unfortunate in its termination, it may be an incentive to others to take decisive and exact measures in similar cases, thus helping development in the field of brain surgery in our midst.

Miss C., twenty-four years of age, single, was taken to the Lane Hospital, in the forenoon of August 15, 1896, suffering from severe ear and head symptoms. To an urgent telephonic summons I responded immediately, and was with the patient at 2 o'clock P.M.

Patient had suffered from purulent chronic otitis media on the right side, dating from an attack of scarlet-fever during childhood. Two years ago, she was treated by me during nine weeks for a subacute attack of the former trouble. The earache and discharge present at that time ceased, and when dismissed she could hear the ticking of my watch $\frac{3}{14}$. She syringed her ear daily since then, and it had given her no trouble.

The illness from which she was now suffering, "in consequence of a cold," commenced twelve days ago; she then began to suffer from earache, followed by reappearance of discharge. Six days subsequently, a severe chill was followed by six or seven others, less severe than the first, having more the character of a moderately severe shivering attack. Vomiting ensued after some of the chills. We were informed that fever had been high, although her temperature had only been taken once, two days previous to her admittance to the hospital; it was then 101°. The patient had been very weak for a few preceding days, suffering continuously from severe, dull headache in the right temporal region; bowels very loose. Owing to little sleep and little nutrition, the patient became rapidly emaciated. Color of the face, yellowish; lying in a half-recumbent position in a hospital chair, the patient's face indicated suffering; her mental condition one of drowsiness; questions were answered slowly, apathetically; the intellect appeared dulled; and the patient's strength, after a long night's railroad journey, was fairly exhausted. On examination, the external ear was seen to be slightly scalded by hot poultices which had been applied. Auditory canal closed by a plug of cotton-wool, wet with a copious, ill-smelling, purulent discharge; external canal fairly spacious. No sinking of upper wall. Large perforation. A narrow strip of tympanic membrane above, adherent to promontory. No ossicles visible. Eustachian tube freely permeable on catheterization. Integument over mastoid pale; no œdema. Distinct sensitiveness over the whole mastoid extending to its tip. Pupils moderately contracted. After the use of a mydriatic, the ophthalmoscope revealed healthy fundus, mobility of eyes normal, no signs of motor disturbances in face. Temperature, 102°; pulse, 102. The very severe and striking clinical aspects of the case before us indicated, beyond a doubt, brain complication, spread there by pyogenic infection from the right ear. The probabilities were that the cerebral invasion had been for some time past slowly preparing; the acute setting in of grave symptoms only dated from six days back, but had set in immediately with very threatening symptoms; severe and repeated chills, vomiting, high temperature and pulse, constant and severe headache, drowsiness.

As the patient evidently could live only a very short time, an opening of the cerebral cavity was clearly indicated, and, in consultation with Dr. Lane, an immediate surgical interference was decided on as imperative. The patient was forthwith made ready and etherization proceeded with. Although there was no swelling, and the posterior and upper walls of the external meatus were not sunken, it was considered best, on account of the sensitiveness to pressure, to open the mastoid, in order to get an entrance through it into the brain. An extensive incision, parallel with and behind the insertion of the auricle, was made through all the tissues, to the bone. The periosteum was pushed carefully aside, the bleeding easily controlled with forceps. The bone was normal in color over the whole exposed surface. A few strokes with the chisel revealed eburnization of the bone to a depth of 1½ centimetres. There were apparently very few mastoid cells, and the antrum was reached at a depth of nearly 2 centimetres without a trace of pus. There was a slight bleeding from the intensely compact bone. The greater portion of the posterior osseous wall was then removed, and soon the tegmen of the tympanum was reached, without finding a trace of any ossicles. Examination with probe failed to reveal an erosion in the tegmen of tympanum or antrum. The mastoid was then completely chiselled through the opening, being about one half inch in diameter, and the dura was exposed over an area equal to about the size of a twenty-five cent piece, by means of bone-forceps. The bone was very brittle and dark colored ; the dura of an ashy-gray color, and very tense. No pulsation was discernible to the eye, but could be detected by the finger. The aspirator-needle was then introduced into the most suspicious-looking spot, bringing out ⅓–½ a drachm of a bloody, fetid pus. The dura was then taken up by forceps and opened with scissors to the extent of half an inch, and the aspirator-needle passed in different directions without finding more pus. The bone was still farther cut away, and the dura opened downward toward the tegmen tympani about half an inch. The brain tissue there was found to be extensively ulcerated and necrotic ; all further attempts to get at a pus cavity with trocar and narrow-bladed knife failed. There still was, however, a good-sized opening, which was then gently flushed with warm, sterilized water. The patient sank rapidly, and the wound was then dusted with iodoform and boraic acid 1–3 parts, and packed loosely with iodoform gauze. The external wound was partly closed by a few catgut sutures, and a dressing applied.

There was no marked shock after the operation ; the temperature three hours later was 99.8°, pulse 130. The temperature rose gradually to 103.6° at 1.30 A.M., then declined until 7.30 A.M., when it reached 99°. The patient was fully conscious, and was given during the night, to relieve pain, phenacetin grs. x and McMunn's elixir of opium m. xx. As nourishment she took milk and rice at proper intervals. She complained continually, after the operation, of pain in the right side of the head and in the left arm, especially the shoulder.

During the day (Sunday) the patient continued in a more or less drowsy condition, and the fever gradually rose to 104.3° in the afternoon. The dressings were removed late in the afternoon, and owing to the rise of temperature further search was made for pus. The needle was inserted in several directions, finally bringing up pus, a little deeper and more anterior to that found the day before, in such a quantity that there seemed to us no doubt of the abscess cavity having been struck in the temporo-sphenoidal lobe. A pair of blunt forceps was then inserted along the track of the needle, and by spreading the blades, a free opening was made to the site of the pus. The brain tissue about and above the abscess cavity was decidedly necrotic. The cavity was then packed with iodoform gauze, the wound redressed as before, and an ice-cap applied to head.

Shortly after this dressing the temperature rose to 105.6°, but fell during the night to 102°. All day Sunday the patient was given whiskey and egg-nog every two hours, as much as she would take, which was from one to three ounces. She was restless, and complained of pain most of the time.

On Monday morning the temperature was 105.6°, the pulse 143, remaining high all day. The patient was in a comatose condition, from which she could be only aroused once during the day. Nourishment was given per rectum, but little was retained. The wound was dressed in the afternoon; the packing was found saturated with fetid pus and covered with sloughing brain tissue. The patient then gradually sank, dying about 8 P.M. Before death the temperature was 103.2° and the pulse 160.

Autopsy.—Vertical incision 4 inches long, extending from tip of mastoid to 2 inches above the ear on the right side. Excavation in mastoid ½ inch in diameter posterior to the external canal. Posterior wall of canal cut away, opening antrum and tympanic cavity. An interval in skull immediately above about 1 inch in diameter, from which protruded meninges and sloughing brain substance. The bone anterior to this opening dark in color, otherwise normal. On opening dura, a small amount of fetid pus escaped from the region over the posterior part of the temporo-sphenoidal lobe. This lobe and adjacent posterior portion of the brain were compressed and covered for an area 4 inches by 3 inches with pus, the vessels were injected, and there was considerable superficial necrosis. This area was bounded by very delicate adhesions. The middle fossa of the skull contained pus beneath the dura ; but the cerebellar region was free from pus and the lateral sinus was normal.

On section, the brain was found diseased only superficially over the area described above. In the centre of the temporo-sphenoidal lobe was found an abscess cavity about 1½ inches anterior-posteriorly, and ½ inch vertically and transversely, lying in the white substance of the brain, immediately above the tegmen tympani. The incision made during the operation opened into this cavity surrounded by sloughing brain. The temporal bone showed no microscopical changes in this region, the dura was not unduly adherent, nor could any opening be seen through which the pus from the ear might have invaded the brain.

NOTES UPON SOME NEW LOW-TONED TUNING-FORKS FOR CLINICAL PURPOSES.

By EDMUND D. SPEAR, M.D., Boston.

A PAPER published in the Medical and Surgical Reports of the Boston City Hospital for the year 1896, but originally written in part as early as 1891, contains a reference to the use of low-pitched tuning-forks in testing the hearing power of patients in whose ears objective appearances are wanting.

In that article the use of some form of sonometer, consisting of a series of tuning-forks, was also advocated for general use for aurists. My convictions as to the importance of having many standard forks for testing purposes were strengthened when I learned of Prof. Bezold's experiments with forks constructed by Edelmann of Munich.

Physicists naturally turn to Koenig, of Paris, for information concerning so important a matter as the making of acoustical instruments of precision, and readily learn that forks of all sizes can be obtained from him.

Up to the time of Prof. Bezold's last publication upon this subject, steel had been considered the proper metal out of which all forks should be made. The serious objections to steel as a material for the manufacture of low-toned forks, aside from its weight, arise from variability in its quality and texture, and these objections apply almost equally to mixtures or alloys of softer metals, even to those of aluminum. Edelmann used bell-metal in Bezold's forks. The quality of this latter metal seems to depend in great measure upon the quality of conscience possessed by the foundryman, and not infrequently an excellent alloy may be spoiled by careless handling in the crucible.

While this criticism applies with almost equal force to the alloy chosen for the writer's forks, its power is greatly weakened by the fact that the original alloy contains substances less capable of oxidation from overheating, and by working on a large scale a uniform result can always be obtained.

By careful attention to details during the different stages in the process of manufacture, a skilful workman has lately produced for me some fine instruments with very few overtones. Forks giving tones corresponding to those in the lowest octaves have already been finished, and by having solved the problem and passed the experimental stage, the production of any desired tone is now possible.

The lowest fork of my series is Bb .29 M. long (less than 12 in.) and weighs .312 Kgm. (11 oz.).

Of all instruments for producing the tones of the musical scale now in use, the tuning-fork is best suited to the purposes of the aurist, and when great accuracy in deciding the loss of individual tones is essential, the comparative uniformity of tone in this instrument admits of the detection of slight variations from normal.

In making the hearing test of aural patients I prefer to have a fork for each separate simple tone. To obtain a pure tone or the fundamental tone of any fork it is absolutely necessary to damp its partials either by touching the instrument at its node or by supporting the instrument between one's thumb and finger at its node after sounding it.

This method of obtaining a tone free from overtones has long been taught by the writer, and was referred to in his article in the City Hospital Reports.

From the Transactions of the International Congress of Psychology is appended the title to Prof. Bezold's paper, entire, with an abstract from the essay itself.

" Demonstration of a Continuous Tone-series (sonometer) for showing defects in the hearing, especially among deaf-mutes, and the significance of its indications according to the Helmholtz theory."

" The series of instruments consisting of tuning-forks and whistles, spoken of in this essay under the name of continuous tone-series (sonometer), is first in importance among the necessities in the outfit of the aurist of the future."

" In the lower half of the tone scale from C_{II} with sixteen vibrations (double) and under, up to C_{III} the separate tones are produced by means of ten tuning-forks with sliding weights. The highest tone of every deeper tuning-fork is also contained again as an undertone in the next higher one."

" So far as a practised ear can determine thereon without further expedient, the combined tones of these loaded tuning-forks are free from overtones."

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AN INITIAL SYMPTOM OF SCLEROSIS.

BY DR. ZWAARDEMAKER, UTRECHT.

Translated and abridged by Dr. ARNOLD H. KNAPP, New York.

AS now, through the researches of Politzer and Bezold, the conception "sclerosis aurium" has lost its former uniform character, which Walb in Schwartze's Text-book still gave it, we will first define accurately the disease in question before describing a new initial symptom.

Walb's primary sclerosis can be subdivided as follows:

1. The primary disease of the bony capsule of the labyrinth.[1]

2. The adhesions of the stapes to the walls of the oval window, a similar condition surrounding the malleus and at the round window by thickening of partly fœtal bands[2] (hereditary[3]).

3. The general sclerosis of the tympanic mucous membrane and the tubes, probably subsequent to a similar process in the naso-pharynx.[4]

In addition to these three processes, progressive from the onset and always bilateral, a secondary sclerosis has been described, resulting from a chronic aural catarrh. This is characterized by the formation of exudates or occlusion of the Eustachian tube, at least in the early stages of the disease, which are followed by changes in the drum membrane (thickening, cicatrices, deposits of lime), or by retraction of that membrane. Primary, as well as secondary, sclerosis may lead to anchylosis of the stapes, which is always the case in the process described by Politzer under 1.

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[1] Politzer, *Zeitsch. f. Ohrenhlk.*, vol. xxi., p. 309; these ARCHIVES, vol. xxiii., p. 253; Bezold, *ibid.*, vol. xxvi., p. 9; these ARCHIVES, vol. xxv., p. 67.

[2] Habermann, *Schwartze's Text-book*, ii., p. 24.

[3] Moos, *Schwartze's Text-book*, i., p. 489.

[4] Gradenigo, *Gougenheim's Ann.*, 1868, p. 130.

This schematic arrangement is not perfect, and is incomplete. Certain subdivisions, based on pathological examination, were omitted as the ossification of the stapedio-vestibular ligament, the thickening of the mucosa of the round window, etc. The diagnosis in the living, however, rarely determines more than a bilateral progressive middle-ear affection, which is primary and without pain, without exudate, and without change in the drum membrane. A well-known characteristic of these cases is the early loss of hearing of the lower tones. Bone-conduction of forks of a medium octave is excellent. These are the most reliable symptoms, besides the appearance of the drum membrane, the immobility of the malleus, and the sound on auscultation.

I wish to draw attention to a new functional symptom, which is of importance in the ordinary form of sclerosis (anchylosis of the ossicular chain without involvement of the labyrinth). It is limited, therefore, to two of the above-mentioned processes: adhesions of the oval window and sclerosis of the tympanic mucous membrane and of the tube. It is uncertain whether the first stage of the primary disease of the bony labyrinthine capsule is included. At all events it does not hold good for the complete disease described by Politzer and Bezold. This is a true initial symptom, a symptom which may persist for years and be unnoticed, and is only characteristic for the first stage of the disease. We may select the following definition. In primary sclerosis, almost without exception, a displacement of the upper tone-limit takes place upward above the normal limit; it may remain stationary during the first years, and gradually contract again or become displaced downward. A sclerosed ear will hear during this stage one, two, or more half-tones than a normal ear of the same age. The latter fact furnishes us with a convenient scale to measure this symptom. I have examined 50 cases of sclerosis aurium for the chromatic or continuous (Bezold) scale. The upper tone-limit was as follows:

Raised, upper-tone-limit	32
Normal, upper tone-limit	5
Lower, upper tone-limit	13
	50

The typical cases belong in the first group. In the second group are the cases which have existed for a length of time, the initial symptom has become less marked, and the upper limit has returned to the normal. We have united these two groups of cases in one table. On examination we find that there are 5 cases where the tone limit was not found elevated in one of both ears; the process had existed for several years, and the round window had become less accessible to the waves of sound. We cannot, therefore, consider these 5 cases as exceptions. Opposed to these, there are 13 exceptional cases, of which 8 were far advanced.

Of these thirteen cases there were eight where the process had advanced to such an extent that we can no longer speak of a beginning sclerosis. In these an elevation of the limit could be expected. Secondary stapedial ankylosis, and perhaps commencing labyrinthine involvement, must be present at least in three cases. It is generally accepted that the immobilization of the ossicles is followed by a lesion of the inner ear. This process need not be limited to the base of the cochlea to produce a decided loss of hearing for the the highest tones, as it is quite possible that the latter simply cause a diminished auditory power for all the tones heard in the beginning of sclerosis. A premonitory sign of the progression of the process to the inner ear is perhaps the paracusis Willisiana. Urbantschitsch, as is well known, has given a different explanation for this phenomenon than the usual one, and has located the process in the labyrinth. I should like to concur with his opinion and consider the paracusis Willisiana an altered condition of the excitability of the sound-perceiving apparatus, characterized by the fact that the excitation-threshold is elevated, but the difference-thresholds have remained almost unchanged. The cause for such a change cannot possibly lie in the conducting-apparatus, as a lesion there, would cause an elevation of both. We are forced to look for the cause of the change in the excitable elements themselves. The unfavorable prognosis of the paracusis Willisiana in sclerosis is readily explained by this line of reasoning, and at the same time the fact is explained why the paracusis usually is present in the advanced cases and not in the beginning sclerosis. Of the remaining five cases, which do not belong to the advanced ones, is one of an officer who lost his hearing from the effects of shooting practice. In this case the involvement of the labyrinth was very likely present. Two further cases were chronic aural catarrhs where no exudate or occlusion of the Eustachian tube were found at the examination. These cases are not true sclerosis still we did not wish to exclude any cases which might have some feature of the disease. Two cases remain unexplained. The one was examined but once, and was complicated with a fatty heart and obesity. The other was a genuine sclerosis, where the lowering of the upper tone-limit has always puzzled me. The lowering of the upper tone-limit would in this case be the only sign of a labyrinthine involvement.

The elevation of the upper tone-limit, as has been stated, is a phenomenon in part of the excellent treble-hearing of those suffering with sclerosis. This also permits the perception of the higher vowel tones, the high sibilant sounds as the Dutch S, etc. This fact is in sharp contrast to the early loss of the lower octaves. The tuning-fork C, free from overtones, when the amplitude of the prongs measures 1 *mm* and more, is no longer heard in incipient sclerosis. The contra-octave of the harmonica, where vibrations of the first overtone are distinctly heard beside the fundamental tone, is very soon lost by the patient. On the other hand, the hearing for the highest octave of Urbantschitsch's harmonica, for the f-sharp^4 fork, and for König's rods is excellent.

In short, sclerosis is a deafness for base-tones, and in the early stages the treble-tones are excellently preserved. There is, in fact, a row of the latter notes which adjoin the limiting tones, and are better perceived than by the normal ear. Our initial symptom may be formulated in still another way, for we may speak of a dislocation upwards of the entire scale, accompanied, of course, by a shortening at the lower end. Does this symptom aid us in the differential diagnosis? It is absent in the chronic catarrh with exudate, thickening and changes in the form of the drum, accompanied by hypertrophic processes in the nose and the nasopharynx, which for some length of time cause an occlusion of the Eustachian tube. It is also absent in the primary disease of the labyrinthine capsule described by Politzer. In the two of the three cases described by Bezold, which were specially examined, a lowering of the upper tone-limit was found. This result agrees fully with the cases where the extreme deafness in advanced cases of sclerosis makes a secondary ankylosis of the stapes probable, and where our initial symptom was found wanting. This, of course, does not prove that this initial symptom could not be present in the beginning affection of the bony labyrinth. Other diseases than the chronic catarrhs and the primary and secondary ankylosis of the stapes need not be considered in the diagnosis, and it seems to me that this, our initial symptom, is of considerable value diagnostically.

I think that it will not be out of place to attempt some explanation for our new-found fact.

The immediate result of a sclerosing process, in the ossicular chain and about the oval window, is an impediment to the conducting apparatus. The vibrations en bloc are thus more or less injured; this has generally been held responsible for the loss of the deeper tones. With the disappearance of these vibrations, however, the interference is also done away with. Helmholtz [1] has proved that the interference for the sound waves of greater length can be disregarded but is of importance for waves of sound of shorter length.

It is an advantage for the upper tone-limit, when the occular vibrations are checked and the bone-conduction is increased by the addition of sound waves. The sound waves are conducted through the temporal bone by a round-about path, and those, directed in a straight line, arrive at the cochlea at about the same time.

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[1] Helmholtz, *Pflüger's Arch.*, 1868, vol. i., p. 1.

It is quite in keeping with our conception that in sclerosis a tone is never gained which the patient has not possessed in early youth. The disease of the conducting apparatus simply permits of the new transmission of tones which formerly, although weak, took place, and later cease, through the loss of bony elasticity. This is most noticeable in the sclerosis of age when the loss in the maturer years is marked and the recovery can be considerable. This symptom is not entirely wanting in the sclerosis of young age.

If we consider the loss of interference to be the chief reason for the elevation of the upper limit, there are other points which may be cited in favor of this supposition. We should like to mention the smooth, firm walls which the sclerosed middle ear usually possesses. This condition makes the middle ear a resonator for tones of short wavelengths.

The initial symptom which we have just described can perhaps help us in explaining another initial symptom of sclerosis. Usually, in the typical cases, continuous tinnitus is of considerable prominence as a symptom even at a period when the patient hardly appreciates that he is growing deaf. The tinnitus is influenced by augmentation of the heart's action, and may become pulsating, isochronous with the heart-beat. The tinnitus is probably a perception of a vascular murmur. The patient, upon inquiry, will state that the tone-height of the tinnitus is very high, and occasionally one will state that it is like the noise made by the Galton whistle when passing over the tone-limit. Hence we may suppose that the tinnitus depends upon a noise composed of a number of very high notes which normally could be heard but are not transmitted. The altered condition, caused by the sclerosis, improves the transmission and causes it to be perceived. The perception is so much easier the louder the tinnitus (increased cardiac activity), or the more acute the irritability of the labyrinth (on awaking).

It seems to me that the tendency of the sclerosing process to perfect the hearing for a certain group of tone during the first few years might aid us in devising a line of treatment. For instance, the pathological condition might be employed.

If it were possible to transpose tones out of the middle octave to a higher tone scale, the patient would obtain a better hearing for music than normally, provided, of course, that the transposition takes place without loss of intensity. The solution of this problem lies really more in the province of a mechanician than a physician, and I think that it is quite possible to invent an apparatus on this idea which would be of inestimable benefit to the many sufferers with sclerosis.

THE POSITION OF THE CONSONANTS IN THE TONE-SERIES.

First supplement to the "Hearing Power of Deaf-Mutes."

By Prof. BEZOLD, Munich.

Translated by Dr. Arnold H. Knapp.

ABOUT three and a half years ago, I examined the 79 inmates of the Munich Deaf-Mute Institute for the remnants of hearing-power and to determine more definitely in each case their limits by means of the continuous tone-series. The results were published in the beginning of this year in my monograph on the hearing-power of deaf-mutes.[1] The qualitative and quantitative perception of tones was examined, and in addition the perception of vowels, consonants, and words, as well as the relation in each case between the hearing of tones and that of speech. It soon became clear to me that the examination of deaf-mutes with the aid of the tone series was not only of theoretic value in determining the various conditions which had led to deafness, and in investigating the physiological function of the various parts of the auditory organ, but also of great practical value in helping the selection of those patients that could be instructed aurally, and to permit us to judge to what degree improvement can be expected in each case.

Fifteen or 19 per cent. of the 79 pupils were completely deaf on both sides for speech and tones. It will be seen later that this percentage is too large. 28 or 35.4 per cent. could hear either on one or on both sides a part of the tone-series in addition to vowels and words. 17 of these 28 were able to repeat at various distances up to several metres several or all the numbers in the same intonation and rhythm as they were spoken; 9 repeated all of the numbers, 5 repeated all except "five," and 3 only a few or a single number. The remaining 11 were able to repeat one up to all of the vowels.

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[1] Wiesbaden, J. F. Bergman, 1896.

Besides these 28 who could hear vowels or words, there were 3 who, though deaf for vowels, could correctly repeat certain consonants. The consonants P, T, and R must be thrown out, as the majority of the totally deaf can distinguish between them.

These 31 pupils who retained a partial hearing of speech are only a fraction of the total number of hearing pupils. 32 pupils, in addition, possessed hearing power for tones which occupy varying portions of the tone-series, and only 15 were totally deaf; 1 inmate could not be examined.

I have arranged the results of the examination of hearing according to the number of individuals, as this permits a better general survey of the results which may be obtained by future examination of deafness than the grouping according to the various auditory organs, which I found necessary in my previous article.

As to the relation between the hearing power for various parts of the tone-series and the hearing of speech of all the hearing deaf-mutes, I came to the following conclusion:

The perception of the area of the tone series included in the interval b^1 — q^2 inclusive is essential to the understanding of speech; if the duration of hearing for these tones sinks below a certain level, it becomes insufficient for the understanding of speech. When the hearing for this interval is absent on both sides, the hearing for speech is also lost.

I showed, further, that this result was in accord with the physiological investigation of the true tones of the vowels, as these are situated chiefly within this part of the tone-series.

We may expect that an examination of a large number of deaf-mutes in regard to the relation of the hearing of tones and speech will determine the position of the parts in the tone series necessary for the perception of each vowel and consonant.

The knowledge of these positions would be of more than theoretical value. We could then, on the basis of the examination of the tones, exactly denote the method of practical tone-exercises for each case; the teacher would know the syllables which are perceived by the pupil and the others which would require cultivation with the articulation method.

A general classification of my results of the examination of the consonants and vowels may be of interest.

It has often happened that the comprehension of a word does not include a distinct perception of each sound contained in that word. A subsequent examination of the sounds often reveals defects. This is explained by the fact that some of the hearing deaf-mutes have learnt to guess the word from the few sounds perceived. Consequently, it was necessary to examine not only the words, but later each separate vowel and consonant. From the grouping of separate examinations, we may draw the following conclusions as to the auditory power for each consonant:

The consonants P, T, and R must be disregarded on the above-mentioned grounds. The consonants M, N, T, and K were most frequently found wanting. M and N are the only consonants whose approximate position in the tone-series Helmholtz has discussed in his *Lehre von den Tonempfindungen*. According to Helmholtz, the humming sound which is caused by the formation of M, N, and Ng adjoins the U situated lowest in the scale among the vowels; the proper tone is placed on F, its timbre permits variations of the proper tone to almost the breadth of an octave. "The nasal cavities which furnish the means of exit in the formation of the above-mentioned consonants have, in proportion to the size of the cavity, still a narrower opening than the buccal cavity in the case of the vowel U." The proper tone of this consonant must consequently be situated still deeper than that of the vowel U.

Oscar Wolf[1] agrees with Helmholtz in the position of M and N, and gives the consonant L an effect equal to one preceding or following a vowel. Wolf considers d^{II} and d^{III} as the upper and lower limits of the consonant K, which is a relatively low position compared to the sibilant sounds, which are also of interest for us.

The frequency of the extinctions of the four consonants M, N, L, and K in deaf-mutes with preservation of some hearing, is explained by means of the examination of the continuous tone series. The lower part of the tone series where we find the location of these consonants is the part which is most often and most extensively extinct among the deaf-mutes. The deaf-mutes, who, in addition to the other consonants, were able to repeat correctly the above four, possessed usually a hearing range which extended down to the E of the large octave.

Case 19 of my previous report was very interesting in this particular. Except for a short range (b^{III} — c^{IV} right, perception for the upper half of the scale was wanting on both sides, commencing in the right at a^{II}, in the left at g sharp^{III}, while the part of the scale below this was heard perfectly and of the ordinary duration. Although the deaf-mute could hear numbers and short sentences, especially on the left side, he could only repeat correctly L and N, excluding P, T, and R. This is the only case where a bi-lateral defect in the upper-tone scale was present, and only the consonants, L and N, placed in the lower part of the scale could be perceived.

Five ears could perceive the K alone, of which three could hear the S correctly. The hearing range extended in these cases from the middle of the Galton whistle or above, as the upper limit, to f^{II} in case 17 r.

" c sharp in case 5 r.
" b^{I} in case 5 r.
" H " " 48 r.

Case 17 shows that a perception for the consonant K may be present notwithstanding the loss of the entire lower part of the tone-scale up to e^{II}, and that its position is to be looked for above this tone. Wolf considers the tone-limit for K to be d^{II} to d^{III}. Four ears were limited in their perception of the individual consonants to F:

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[1] *Sprache d. Ohr.*, Braunschweig, 1871, p. 44.

in Case 21 r. the tone-range was F sharp^{I} to Galton 4.2.
" 30 l. " " " F sharp^{I} to Galton 3.6.
" 1 l. " " " F–g^{IV} and Galton 9.0–6.8.
" 21 l. " " " g sharp^{II} to Galton 4.4.

Leaving out the small island in the Galton in Case 1 l, the pitch of consonant F is situated between f sharp^{I} and g^{IV}. Wolf found this limit to be a^{II} and a^{III}.

Of the sibilant sounds, S and Sh were examined for; Z was disregarded as being composed of T and S.

Five ears could only perceive S of the consonants (excluding P, T, and R); in two, Sh was likewise perceived. In these cases the tone-range extended high into the Galton whistle, to the marks 3.5–2.5. The lower tone-limit was e^{I} (Case 29 l.) h (Case 2 r.), E (Case 43 r), c sharp^{I} and B^{II} (Case 51 r. and l.).

Thus, from the examination of deaf-mutes, the tone-limits for S lie between e and Galton 3.5. Wolf found this to be c^{IV}–c^{V}. The duration of perception for c^{IV} in these five cases was twice 0.4, and once each 0.6, 0.8 and 0.9; in short, considerable.

Usually, beside deafness for the other consonants, there remained a correct power of perception for Sh, *i. e.*, in twelve cases. In addition to this consonant, K was heard three times, S twice, and F once.

The hearing power for the tone-scale extended up in one of these cases to e^{V} only, and down in one case only to c sharp^{II}. The perception for the consonant Sh is therefore to be sought between c sharp^{IV} at e^{V}. Wolf found in Sh the triple sound of a^{III}, d^{IV}, and f sharp^{IV}.

In the other cases, where more consonants than the above were perceived, a larger continuous hearing range for the tone series was present and extended at least from f sharp^{I} to the middle of the Galton whistle.

Not a consonant could be correctly perceived in six cases. In these the hearing range extended from E to the middle of the Galton whistle.

In conclusion, after the above comparison between the perception of the single consonants and the extent of the hearing range within the tone-series in each single case, we may say that these stand in the same accordance to the previous supposition of the position of the consonants in the tone-scale as we found to be the case for the vowels in our first article. The relatively small number of deaf-mutes which were examined did not permit to locate the limits of each sound in the tone scale so exactly as perhaps later examination of a larger number will do.

Hearing tests in the partially deaf have led to similar results. Besides defects in the lower part of the tone-scale, as are characteristically found in chronic affections of the sound-conducting apparatus, the difficulty of comprehension for words containing sounds in the lower part of the scale was present, while in affections of the nervous apparatus with their frequent defects in the upper part of the scale the difficulty of comprehension of words containing an S-sound is known.

INTRACRANIAL EXTENSION OF A MIDDLE-EAR SUPPURATION. OPERATION AND RECOVERY.

By Dr. E. SCHMIEGELOW, of Copenhagen.

Translated and abstracted by Dr. Edwin M. Cox, New York.

THE following case illustrates the difficulties of an exact diagnosis of the intracranial complication of middle-ear suppuration.

A boy, twelve years of age, had a left-sided middle-ear suppuration when two years old; the drum membrane had perforated spontaneously and the subperiosteal abscess which formed behind the ear, had been opened by incision. Since that time there had always been more or less discharge, and it was noted that washing out the ear caused transitory dizziness and the appearance of the fluid in the mouth. On August 5th, 1895, after unusual exertion, there was increase in the discharge which became foul, and on August 18th, the boy went to bed on account of the pain and fever. Under local treatment the pain disappeared, but the dizziness continued, and the patient vomited if he attempted to get up. This condition disappeared in a few days but the discharge was still very free. September 9th, he was well enough to go to school, but on the 14th, had a return of pain, and next day again had dizziness and vomiting. His pulse and temperature were not noteworthy. On September 19th, he could not endure noises and vomited whenever he raised his head. He was then removed to a hospital and his condition noted as follows :—pale, thin, and lying on right side, rational but answers slowly, movements of the head cause dizziness and nausea, no paresis, pupils equal, and tongue protruded straight. Has pain localized in left temporal region. Ophthalmoscopic examination was unsuccessful. Temperature normal, but the pulse only 58 and somewhat irregular. The mastoid region neither swollen nor tender. Examination of the condition of the middle ear was impossible on account of the discharge and the swelling of the walls of the canal.

From the symptoms it was not to be doubted that there was an intracranial lesion following the suppurative condition in the temporal bone, and my diagnosis tended towards a brain-abscess, perhaps with an epidural abscess in addition. As usual, it was uncertain whether the main lesion lay in the middle or posterior fossa; hence, I think it the best plan, first to fully expose the focus in the temporal bone, then to open into the middle cranial fossa, if without result, proceed to explore the post. cranial fossa.

On September 20th, patient was operated upon under chloroform.

The canal and the tympanum were found full of polypoid masses, and the mastoid cells and antrum likewise filled with pus and granulation tissue. This region was treated with the sharp spoon. Continuing the operation, the middle fossa of the skull was entered and an *epidural abscess* and a large glistening cholesteatoma evacuated. Puncture of the temporal lobe in several directions revealed nothing but cerebro-spinal fluid which escaped in great quantity. Through a chiselled opening behind the lateral sinus, the posterior fossa was exposed and the cerebellum was punctured with negative result. After this the wound was packed throughout with iodoform gauze and dressed as usual. Pulse after operation, 80.

On the following day, patient was without headache, nausea, or dizziness, and his improvement was uninterrupted. No change was to be seen in the fundus of the eye when it was examined on the second day after operation. On October 10th, the granulating wound was treated successfully by skin-grafting.

The usual course in cases of this kind is for the brain-abscess to pursue a latent course so that our diagnosis is made so late that operative treatment is of no avail. In this case, however, the symptoms (slow pulse, nausea, dulness, and headache) were present but we found no abscess. This state of affairs is not uncommon in children in whom, in consequence of retention of pus in the middle ear, very severe brain symptoms may be developed, to be relieved as soon as the pus is evacuated. This is supposed to be due in such cases, probably to a secondary meningeal œdema. The name of *serous leptomeningitis* applied to this condition is inappropriate, since there is no infection in the process. We cannot doubt that there was, in our case, an unusual amount of cerebro-spinal fluid since we saw it escape through the dural punctures, and for some time keep the dressings wet.

The epidural abscess cannot be held responsible for the severe pressure symptoms; I have never known slowing of the pulse to occur in a considerable number of cases of epidural abscess which I observed. That symptom points towards brain-abscess, and it was for this reason that I continued my search for a brain-abscess, after opening the epidural collection of pus.

A CASE OF HOMOLATERAL, ACUTE AFFECTION OF THE AUDITORY, FACIAL, AND TRIGEMINAL NERVES.[1]

By Dr. DANIEL KAUFMANN,

ASSISTANT AT THE EAR CLINIC OF PROF. POLITZER IN VIENNA.

Translated and abridged by Dr. J. Guttman, New York.

PRIMARY affections of the auditory nerve, not caused by external influence (trauma, concussion, etc.), by organic diseases, or by affections of the middle ear, are not often observed. In the majority of such cases both ears are affected, and but rarely do we find unilateral, acute affection of the sound-perceiving apparatus with coincident affections of other cranial nerves.

A man of about thirty-four years of age, always healthy, had never suffered from any affection of the ear, and possessed normal hearing power, was taken ill on July 20, 1896, with general symptoms of malaise, fatigue, loss of appetite, occasional headaches, and evening rise of temperature to 38.4° C. On July 25th the skin of his left cheek became red, covered with small blisters, and was painful. Professor Drasche considered it a case of herpes zoster. On the same afternoon the patient complained of intense headache, great debility, vertigo with recurring vomiting, and was compelled to stay in bed. In the next few days the patient suffered from repeated vomiting, vertigo, intense headache, and slight rise of temperature, but without any apparent affection of the internal organs. On July 29th, paralysis of the left side of face and tinnitus aurium with total deafness of the left ear developed. The symptoms then subsided, the fever diminished, the redness and pain of the left cheek disappeared, but the patient still suffered from occasional headaches, total loss of appetite, debility, insomnia, vertigo, and tinnitus.

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[1] Read at the meeting of the Austrian Otological Society, November 24, 1896.

Dr. Lorenz diagnosticated total paralysis of the facial nerve in all its branches (frontal, orbital, and oral), together with loss of taste on the left half of the tongue (the uvula was not paralyzed) and deafness; the examination of the internal organs and the nervous system proved negative. When I first saw the patient, on August 10th, there still existed a total paralysis of the facial nerve with flow of tears on account of the lagophthalmus. The condition of the ears was as follows: R ear normal; L ear: the auditory canal normal, the drum-membrane was superficially swollen (from repeated instillations of cocaine), but of normal relief. Nasopharynx, Eustachian tube, and mastoid process normal. The patient could only hear with his right ear; this was proven by the fact that on the left side whispering was only audible ad concham, loud speech at hardly ½ *m*, and it was immaterial whether the left meatus was tightly closed or not. The tuning-fork placed on the head was heard only on the right side. On light tapping of the tuning-fork no sound was heard on the left side through air conduction; bone conduction was very greatly shortened (hearing with the other ear?). The patient suffered greatly from vertigo, especially when standing with eyes closed; he could not walk in a straight line, and was unable to stand on one leg.

The patient was ordered to remain perfectly quiet, and was given 1 g. of iodide of sodium daily. On August 17th the general condition had improved, no vomiting, the patient still felt greatly fatigued and drowsy. The facial paralysis improved, the skin on the left half of the forehead could be wrinkled, the eye almost closed, no paralysis of taste. The lower branches of the facial remained affected. The left drum appeared to be perfectly normal, the patient heard whispering voice at a distance of ½ *m*, and loud speech at a distance of 2–3 *m*. In addition to the iodide of sodium injections of pilocarpine were made, commencing with 0.005 at a time. Hearing exercises were instituted. On August 20th, fatigue and drowsiness still complained of; no dizziness; continuous tinnitus in the left ear. The innervation of the oral branch of the facial was improved. Hearing power for loud speech in 3 *m*; Weber constantly to the right. The time of perception for air and bone-conduction, especially for the high notes, was very much shortened.

Ten sub-cutaneous injections of pilocarpine were given up to September 4th; after each injection the secretion of saliva and sweat was increased sometimes with slight nausea, and ardor urinae, which disappeared after a quarter of an hour. The general symptoms gradually improved. The patient was able, though with great exertion and some fatigue, to work in his office for one to two hours. The facial paralysis disappeared on August 27th, but the patient still complained of great debility, little appetite, occasional dizziness, continuous tinnitus and the hearing power remained for whisper at ¼ *m*, for loud speech at 2-3 *m*.

I saw the patient again on November 5th. He was physically greatly improved, and complained of nothing but the continuous tinnitus and feeling of deafness in his left ear. Loud speech heard in about 2 *m*. Weber lateralized to the right (the good ear). Rinne positive for the tuning forks of medium pitch with a decided shortening of the time of perception; a slight tap of c_4 was not heard at all on the left side, c only for a short time; no vertigo, even when walking with closed eyes.

We cannot state anything positive, as to the nature of our patient's trouble. On account of the simultaneous affection of the second trigeminal branch (herpes) and of the facial nerve above the giving off of the chorda tympani and on account of the deafness, accompanied with vertigo, we must consider the seat of the disease to be external to the temporal bone, probably in the nerves of the left half of the base of the brain. The acute onset of the disease with fever, the lack of pressure on the brain (ophthalmoscopic examination normal), the normal state of all other cranial nerves, the gradual amelioration of all symptoms, speak against the diagnosis of tumor, aneurysm or hemorrhage. Hysteria can easily be excluded; there is surely no evidence of syphilis. Meningitis (cerebrospinal, epidemic or chronic) could not have existed, because there was no unconsiousness and the symptoms were confined only to one side and disappeared later.

A number of cases of rheumatic deafness have been described in the literature (Bing). Frankl saw among 120 cases of unquestionable rheumatic paralysis of the facial nerve, four cases of simultaneous deafness; in two cases there was in the beginning, total deafness. As there undoubtedly exists a connection between rheumatism and neuritis, it is quite consistent to consider the disease of our patient, as a neuritis, which affected the second branch of the trigeminal, the facial and the auditory nerves. It is true, that neuritis very rarely affects the nerves of the special senses.

The premonitory symptoms, the febrile onset of the disease, the appearance of herpes zoster, the speedy course, and the disappearance of most of the symptoms indicate the case to be one of neuritis. That the function of the ear was not entirely restored, may be explained by the statement of Politzer's, that "taken all in all, the restoration to the normal state is quite rare, owing to the very slight resisting power of the terminations of the auditory nerve in the labyrinth where the process of repair is combined with an obliteration of the function" (Politzer's Text-book, p. 523). On the other hand it is well known that the vertigo may disappear entirely.

Similar affections have rarely been described in the literature. J. Hofmann has published analogous cases in his article, "Contributions to the study of peripheral facial paralysis" (*Deutsche Zeitsch. f. Nervenhlkde*, vol. v., 1894).

In one case after exposure to cold, a bilateral complete facial paralysis set in with fever, and sensory disturbance in both halves of the face. Three weeks later hyperæsthesia of both auditory organs with diminution of sight due to an optic neuritis developed. These symptoms finally disappeared in part. Hofmann regards this as a case of neuritis multiplex.

In another case after exposure to cold, paræsthesia, pain and a vesicular eruption appeared in the right side of neck and face. This was followed by right facial paralysis, tinnitus and deafness in the right ear. Gradual improvement of all the symptoms.

Hofmann thinks that the deafness in this case is due to an aural catarrh and not to an affection of the nerve itself notwithstanding that the combination of aural catarrh and rheumatic facial paralysis is very rare according to Bernhardt.

Sensory disturbances during the course of a rheumatic peripheric facial paralysis have long been known to occur. Some authors consider them and the herpetic eruption in the face to be likewise due to the affection of the facial nerve. Dr. Frankl-Hochwart in his monograph, "The symptom complex of Menière's disease," 1895, p. 14-15, describes three similar cases of one-sided deafness with facial paralysis of acute onset. He regards the simultaneous involvement of the seventh and eighth nerves, to be probably due to a process at the base of the brain (rupture of a degenerated artery or a small aneurism).

REPORT ON THE SIXTH MEETING OF THE GERMAN OTOLOGICAL SOCIETY, HELD AT DRESDEN, JUNE 4 AND 5, 1897.

BY DR. JENS, HANNOVER.

Translated by Dr. MAX TOEPLITZ, New York.

President: ZAUFAL, Prague.

SIEBENMANN, Bâle, is elected president for the following year.

Papers.

1. MANASSE describes **Interglobular Spaces Containing Cartilage in the Human Labyrinthine Capsule.**

2. KÜMMEL, Breslau.—**New Formations of the Ear.**

KÜMMEL discusses the granulation tumors which, for the greatest part, comprise the so-called aural polypi apart from true fibromata of rare occurrence. The causes of the tumor-like growth are particularly necrotic substances of different kind, foreign bodies, chemical or mechanical irritations. They consist histologically of granulation tissue with numerous giant cells; frequently of cysts only, foreign bodies, or lymph follicles; are covered with epithelium, become fibrous, and are quite vascular. True angiomata are rare, and are almost exclusively situated upon the auricle and in the external meatus; the same holds true with chondromata and real osteomata. The so-called exostoses are more frequent, partly inflammatory, partly congenital; the latter particularly in races of the New World. They may produce clinically a dangerous condition by retention of pus and have to be operated with the chisel or the burr driven by the electric motor. Benign epithelial tumors are papillomata, which form the boundary line, and adenomata of sebaceous glands, both of rare occurrence; atheromata and dermoid cysts are more frequent. In close affinity with the latter are cholesteatomata, a part of which are positively primary tumors developed from portions of epidermis, which have in some way entered the petrous bone: endothelial cholesteatomata are extremely rare. The secondary spurious cholesteatoma is anatomically and to a certain degree clinically different. Endothelioma has been observed only in isolated cases upon the auricle and the tympanic mucous membrane; they offer a comparatively good prognosis, but relapse at their original location. Sarcomata rarely originate from the external parts and the acoustic nerve; much more frequently from the petrous bone, and occur in all histological varieties. The most unfavorable prognosis is furnished by the melanotic and round-celled sarcomata. The carcinomata are somewhat rarer, but produce rather less of substance than genuine tumors. The malignant tumors up to the present have rarely been operated upon, although in some, particularly in cancroids, good results might be occasionally obtained.

Discussion.—TREITEL presents the specimen of an aural carcinoma, where the sinus was completely pushed aside and the posterior portion of the petrous bone almost entirely destroyed.

BARTH operated four weeks ago on a carcinoma, which had extended far into the deeper parts. During the operation, the semicircular canals were opened; the patient had never complained of pain. With reference to cholesteatoma he mentions two cases, which in chiselling exhibited isolated, small white spots, appeared like miliary tubercles, but proved to be beginning cholesteatoma. Barth believes it to be a degeneration of the cells of the middle ear. LEUTERT holds, that all cholesteatomata have grown into the bone from without.

WALLIZEK has observed a lipoma of the posterior surface of the auricle; chondromata are not as rare as it is believed.

BRIEGER reports a case of angioma with intense hemorrhages. He advocates an attempt at radical operation in carcinoma in spite of the slight prospects. In cancroid of the auricle, local relapses readily take place. Owing to the ready occurrence of concussion of the labyrinth, the operation of exostosis is to be performed only in an emergency, inasmuch as the retention is frequently due to swelling of the soft parts.

KÜMMEL concludes the discussion by pointing out that peritonsillar abscesses occur also in sarcomata. He cannot explain the multiple small cholesteatomata from remnants of epithelium, and refers to Schwartze's case, in which the cholesteatoma positively did not grow into the bone from without.

3. SCHMALTZ, Dresden. **Etiology of External Otitis, from a Practical Point of View.**

The text-books generally describe two forms of external otitis, the circumscribed and the diffuse; the latter is usually considered to be caused by a slight injury. According to SCHMALTZ there exists another form, which begins with intense itching, continues with slight pain, presents at the beginning a watery discharge, which later on becomes purulent, and ends with an interval during which intense proliferation of epithelium takes place, whereupon the inflammatory stage returns. The affection is almost invariably bilateral, and is observed particularly in persons suffering from seborrhœa of the scalp and from acne, and is cured only if these affections are treated. Schmaltz, therefore, considers the affections to be a seborrhœa and calls it: Dermatitis externa diffusa seborrhoïca. UNNA believes it to be of parasitic origin, due to micrococci.

Schmaltz then exhibited a patient, who, fourteen years ago, had suffered from an injury to the ear by the bursting of the barrel of a gun. The patient came a year ago, with swelling in the mastoid region. During the operation a portion of the barrel 4 *cm* long and 1 to 2 *cm* wide, was found with two-thirds of its length to be firmly imbedded in the mastoid process.

4. KATZ, Berlin. **Demonstrated Microscopical Specimens.**

The first specimen taken from a bat referrs to the connection of Corti's with Deiters's cells which are here not torn apart; the Deiters's cell is somewhat shaped like a pair of tongs enclosing a Corti's cell. KATZ believes that the nerve fibres here terminate. A second specimen exhibits the extension of the acoustic nerve in the macula; the nerve enters the epithelium without the white substance, and separates into fibres, which are contiguous to the cells without entering them. A third specimen is a peculiarly branched cartilage cell, from the cartilage of the Eustachian tube. Katz, also demonstrated several macroscopical specimens of the round window, which showed a heretofore not described excavation under the fossula rotunda. Finally, a specimen of anchylosis of the stapes in sclerosis of the osseous labyrinthine capsule is shown.

5. Beckmann, Berlin. **Pharyngeal Tonsil and Ear.**

The statements upon the frequency of the pharyngeal tonsil vary between one and twelve per cent. Beckmann operates in 50 per cent of all his patients, in those with otitis media in 95 per cent. The hyperplasia is due to frequent acute inflammations which are transmitted to the ear. The mechanism of the tube is thus explained. The M. levator opens the lateral portion, the constrictor together with the levator opens the mouth. The pharyngeal tonsil does not close the tube directly, but by suction secretions are likely to enter the tube.

Brieger considers the acute inflammation of the pharyngeal tonsil as infectious.

6. Friedrich, Leipzic. **Clinical Contributions to the Study of Aural Affections in Tabes.**

Three views exist, upon aural affections in tabes: 1, an affection of the nerve trunk; 2, disease of the middle-ear, due to an affection of the fifth nerve; and 3, lues may exist. Friedrich, believes it be an affection of the neurones, particularly in the spinal ganglia.

7. Alt, Vienna. **Pathology of Affections of the Hearing Organ Due to Compressed Air.**

Alt demonstrates pictures of specimens obtained from animals. Gas bubbles are formed at the base of the brain, in the brain, mesentery; hemorrhages occur in the inner ear, necrotic foci in the spinal cord, and acute myringitis. In the beginning of the aërial compression, one should open the tubes, in order to avoid negative pressure in the middle-ear and labyrinth; in a dog, as a result the entire tympanic cavity was filled with blood (demonstration of a specimen).

The severest phenomena occur in decompression: gas embolisms.

Bezold believes the secondary hemorrhages to be due to the compressed air remaining in the middle ear, which later suddenly escapes. Alt, however, thinks them to be due to the gas bubbles circulating in the blood.

8. Scheibe, Munich.—**Two Cases of Fracture of the Petrous Bone.**

A working girl, aged twenty-seven, is hurled aside by a piece of machinery and remains unconscious for a long time; after a week meningitis; death followed in three weeks. Tinnitus appeared on the fourth day after the injury. On the fifth or sixth day she could hear the voice, but without comprehension. At the autopsy, slight purulent basilar meningitis was found ; the osseous fissure extends into the squama. The other petrous bone, which did not exhibit any fissure when examined with the naked eye, presented microscopically after decalcification a fissure traversing the entire petrous bone ; the facial canal was struck (without paralysis !). Between the edges of the fissure marked signs of healing were found ; young spindle-shaped connective-tissue cells. (Demonstration.)

Second Case.—A tinsmith, aged sixteen, falls from the third floor. Loss of consciousness for several days ; after sixteen days meningitis, after four weeks fatal issue. On the seventeenth day, when the sensorium happened to be clear, the hearing was examined. In the left ear tinnitus without vertigo ; membrana tympani without reflex, in its upper portion slightly injected ; loud conversation heard at the distance of 5 *cm.* The patient was operated upon. At the autopsy the operation wound was clean. Purulent meningitis and hydrocephalus internus. Several fissures, one traversing the medial portion of the pyramid, another vertical to the first and parallel with the anterior margin of the pyramid. Membrana tympani normal ; in the tympanum and aditus, inoffensive pus. The fissure extends into the foramen lacerum. The microscope shows that the fracture here passes through the cochlea (in the first case through the vestibule), not through its centre, but laterally along the modiolus ; horizontal and upper semicircular canal are cut through. Signs of healing quite far advanced ; osteoid non-calcified substance ; mucous membrane of middle ear inflamed.

SECOND SESSION ON JUNE 5TH.

Discussion of SCHEIBE's paper.

HABERMANN demonstrates photographs and microscopical specimens of fissures of the skull.

BARTH has observed a case, in which the discharge became offensive without an infection.

SCHEIBE points out that the fractures may extend into the nose, whence the infection may originate.

ZAUFAL, in 1864, had published the rules, according to which the direction of the fissures is determined, and finds that the cases communicated at this meeting are in accordance with his views.

9. Bezold, Munich.—**Six Additional Cases of Labyrinthine Necrosis and Facial Paralysis.**

Since the publication of his monograph in 1886, Bezold has observed six additional cases. The mortality of from 15 to 20 per cent. is now confirmed. Suppuration of the middle ear almost invariably precedes the necrosis. Among three thousand ear patients and five hundred chronic suppurations of the middle ear, one case of necrosis is observed ; in other words, a very rare occurrence. All were neglected cases, which had not previously been treated. The cochlea alone was most frequently affected, particularly the first convolution. The mode of transmission of the inflammation of the middle ear to the inner ear is twofold : 1, either the cells below the labyrinth become necrotic ; 2, or the inflammation extends through the round window. In children, the route differs, probably as extradural abscess. The picture of the disease is as follows : All cases are deaf ; vertigo existed in one case for eight months, in another a year before ; the facial paralysis appears a month later, four paralyses recovered ; in one of the cases even the Fallopian canal could be seen in the sequestrum. The granulations are quite abundant.

The treatment consists of cleansing and removal of the granulations. In one case Bezold performed Wilde's incision, in two cases the radical operation with Koerner's flap. The sequestrum itself ought not to be attacked.

Results.—Several cases with epidermoidal cavity, one case with atresia of the external canal.

The examination of hearing is very difficult. Bezold has formerly expressed his doubts of the hearing faculty. He demonstrates tables made according to Hartmann and Gradenigo, which prove beyond any doubt that the apparent hearing power is dependent upon the healthy ear. One table in particular was very instructive, since in the affected ear two tones were missing about the centre of the (apparently !) perceived series, while for these two tones the healthy ear also presented quite a considerable decrease.

10. Hessler, Halle.—**Caries Sicca Acuta of the Mastoid Process.**

Report of two Cases.—A lady had contracted, through scratching, a slight injury to the external meatus ; after two weeks, intense pain. In chiselling, a brownish discolored portion of the bone without injection ; no pus was found. Middle ear normal.

In the second case a similar injury; after four days the patient urged the operation, which revealed the same brownish discoloration of the bone without inflammatory injection; the bone toward the antrum was very brittle and appeared lighter. After an intercurrent inflammation of the membrana tympani, and tonsillitis from the fifth to the eighth week, several small sequestra of bone were cast off; during the sixth week, pyæmic signs without the appearance of pus. In neither case, rise of temperature.

The immediate success justifies and necessitates the operation, which most rationally consists of an early incision into the external meatus.

11. BRIEGER, Breslau.—**Principles for the Medicamental and Local Treatment of Suppuration of the Middle Ear.**

One ought not to be limited to one drug. Acute suppurations of the middle ear are to be left alone as long as the reactions are to be considered as healing processes; secondary infection from the tube or external canal is to be avoided; for the removal of pus, peroxide of hydrogen is instilled into the external canal; the so-called abortive action of carbolized glycerine is probably due to spontaneous recovery.

Chronic inflammations, as a rule, do not spontaneously heal; irrigations from the external canal seem to be more dangerous than the catheter; gaseous drugs are not applied, but powders and fluids; against Stacke's view, the antrum may be reached with fluids, as Brieger demonstrated in the cadaver, when correct position of the head is established, although in pathological cases the passages may be obstructed. The antiseptic remedies act but weakly in albuminous solutions, and are not sufficient to effect a cure. The most efficacious remedy is nitrate of silver. The action of alcohol consists primarily in dehydration. The essential part of treatment with boric acid is said to be the mechanical effect: occlusion of the tympanic cavity and exsiccation; the former creates certain dangers. Argonin cannot be recommended, according to Brieger's experiments. The province of operative treatment may be limited by these remedies; different drugs, however, should be used in combination.

Discussion.—BEZOLD defends boric acid, aided by the tympanic tube; osteo-sclerosis acts as protection.

SCHMIDT recommends moist dressing, with aluminium acetate (1 : 4).

STACKE uses boric acid also for after treatment in radical operations, but warns against its use in small perforations, and by the patient himself.

LUCAE recommends formalin, 20 drops in one litre of water.

HARTMANN defends carbolized glycerine.

12. HOFFMANN, Dresden.—**Contribution to the Study of Otitic Sinus Thrombosis.**

A boy, æt. four, suffered since his first year from otorrhœa, at times offensive, but without other symptoms. A week previous to operation, intense pain in and behind the ear, with extensive swelling. Caries and cholesteatoma in tympanic cavity and antrum ; large destruction of bone in the posterior wall of the mastoid process ; extensive perisinuous abscess. Sinus, not pulsating, when incised was found to be 1 *cm* wide, filled with offensive pus, and obliterated in both directions. Recovery.

Discussion. JANSEN, among eight patients, operated for sinus trouble where the sinus alone was attacked ; five recovered, three died ; among seven operated by way of the jugular, six recovered and one died.

KÜMMEL demonstrates specimens of a resected jugular.

HABERMANN, in one case, incised the sinus, left the firm thrombus untouched, and did not ligate the jugular ; recovery.

SCHEIBE has found streptococcus in one half of the cases.

PANSE has observed the penetration of cholesteatoma into the sinus.

13. PANSE, Dresden, demonstrates **A Collection of Ossicles, Removed through the External Meatus, and Preserved in Alcohol in their Natural Position for Subsequent Microscopical Examination.**

For operative interference, the diagnosis of isolated disease of the ossicles, particularly that of the incus, or the implication of the aditus and antrum, is of importance. Isolated caries of the incus is diagnosed : 1, after long treatment of suppuration without benefit ; 2, if the removed incus is found to be diseased ; 3, if the suppuration is cured after its removal.

PANSE has made schematic drawings of the membrana tympani and found the following signs for isolated caries of the incus : 1, chronic scanty suppuration ; 2, perforation in the posterior upper quadrant ; 3, with frequent preservation of the limbus in that place ; and 4, polypi or pus directly from above. He recommends to perfect and establish the diagnosis of incudal caries by schematic drawings and thereby promote the indication for the removal of the ossicles.

Discussion.—STACKE and JANSEN prefer to precede the removal of ossicles by the radical operation.

PANSE demonstrates the original drawings and serial sections made for his book (*Deafness Due to Rigidity of the Tympanic Windows*, Jena, Gustav Fischer), pointing out the advantageous position of the anterior third of the oval window. The labyrinth is but 1 ½ to 2 *mm* distant from the foot plate, which is at times connected by bands with the utricle; the latter, when stretched, cause vertigo, according to Panse. The facial nerve lies about ½ *mm* laterally and downward, covered by a thick osseous layer. For stopping the hemorrhage from the bone he uses a "Compressor" (demonstration). He presents under the microscope a stapes removed from the living with periosteal proliferation of the vestibular side. In this and in the other demonstrated sections, the cartilaginous plate is always seen to have been removed. In conclusion, Panse advocates experiments to be made in radically operated persons upon the action of the artificial operculum (moist cotton), which are as important as glasses for persons operated for cataract and myopia.

Discussion.—HABERMANN reports a case of extraction of stapes; if both windows are obstructed, vibrations cannot take place in the labyrinth.

14. PASSOW, Heidelberg, reports a case, in which, after preliminary tenotomy and subsequent retraction of the auditory canal, a small portion of the lateral wall of the attic was removed, and an opening was made with a protected burr down to the stapes.

The effect was very good; immediately after the operation, no tinnitus, no vertigo; whispered voice perceived through the dressing at a distance of about 30 inches. This condition has persisted. A second case cannot as yet be definitely reported, where all ossicles had been left in place, but an opening had been burred into the labyrinth (at the anterior lower margin of the oval window).

Discussion (of the last two papers).—HOFFMANN dissected off the auricle, after an unsuccessful removal of the malleus and incus on account of intense tinnitus; the stapedial limbs were atrophic, and broke off. The tinnitus ceased in the other ear and became intermittent in the operated ear. The deafness was not improved, but the hearing was impaired in the non-operated ear.

JANSEN has observed in radically operated persons with good hearing power, after ossiculectomy, decrease of hearing faculty for the whispered speech.

ZARNIKO points out that the wall of the Fallopian canal toward the oval window is quite thin.

KESSEL believes that the improvement of hearing after unilateral operation depends upon muscular action.

AFTERNOON SESSION.

15. NOLTENIUS, Bremen.—**Contribution to the Study of the Radical Operation of the Middle-Ear Cavities.**

NOLTENIUS has performed 132 chiselling operations, among which were 107 radical ones, 64 times according to Zaufal and 43 times according to Stacke, with altogether two deaths. Sinus affection and cerebral abscess were not observed. The extraction of the ossicles alone and the use of tympanic tube have yielded but doubtful results. Stacke's operation is not more difficult than Zaufal's. Noltenius has of late again drawn out the *entire* external membranous canal without producing necrosis. He has modified Barth's hook in such a way as to prolong the middle rod by double its length, thus saving an assistant. Temporary paralyses of the facial nerve have occurred in both methods.

Koerner's flap ought to be formed into the concha and its base made 1 *cm* wide. He then passes a drainage tube, 13 *mm* thick, through the external meatus, and uses small pieces of gauze for plugging. The wound behind the auricle is primarily closed with good effect. In particularly favorable cases, the healing may take place in six weeks; the average duration lasts from three to four months.

Discussion.—JENS combines Koerner's with Stacke's flap by making the longer longitudinal incision half as long as the upper one, while retaining the transverse incision into the concha.

KOERNER individualizes by using not only his own, but also Stacke's and Panse's flaps.

ZAUFAL speaks against Stacke's operation, which ought to be used only in extreme anterior displacement of the sinus. He operates to the antrum with the chisel and then uses a bone forceps. No perichondritis. Primary suture.

16. Winkler, Bremen.—**Operative Procedures for the Exposure of the Upper Nasal Accessory Cavities.**

1. The operative field should be extensively laid bare; and 2, without disfiguration.

Winkler considers the removal of the lower wall of the frontal sinus, according to Jansen, a risky procedure; the frontal sinus and the ethmoid cells cannot thereby be very well explored and treated.

Kuhnt's method, which is designated by many authors as the operation of the future, suffices for the frontal sinus alone; in small frontal sinuses the disfiguration is slight, in larger ones more considerable. Killian's method of temporary resection of bone does not suffice for the exploration of all cavities, and must be combined with Rose's method for the removal of nasal polypi.

If both sides are diseased, the nasal bones should be turned down according to Ollier, or turned upward according to Gussenbauer; the first method leaves a deep scar, and is not well adapted for the accessory cavities. Gussenbauer's method admits a thorough inspection, and excellent final results are thereby attained.

Winkler demonstrates upon a skull the course of the osseous wound; the separation of the bone is performed with the circular saw. Winkler presents photographs of operated persons.

Discussion.—Brieger does not believe the disfiguration to be extreme in Kuhnt's operation. but the healing not to be permanent. In Jansen's method obliteration takes place.

Hartmann succeeds in curing empyemata of the frontal sinus in most cases without external operation, in some cases by treatment of the combined affection of Highmore's antrum. The frontal sinus heals often spontaneously after removal of the anterior end of the middle turbinated body and of some granulations and swellings at the entrance of the canal of the frontal sinus. Extensive operations from without are rarely required.

Jansen produces as much room as possible by exposing through *one* incision many cavities on account of the existence of combined empyemata. He has of late removed the entire anterior wall, whereby he is enabled to reach the posterior ethmoidal cells and the sphenoidal cavity.

Winkler admits that by this method one may inspect and reach more than by that of Gussenbauer.

17. JANSEN, Berlin.—**Some Conditions Opposing the Radical Cure of Chronic Suppurations of the Middle Ear.**

It is quite difficult to remove the osseous portions forming the wall of the tympanic cavity, particularly in the recessus hypotympanicus. He frequently observed the formation of a fistula in the posterior portion of the tympanic cavity. The tube also is frequently diseased, and therefore the cause of returning suppuration. In abundant development of granulations, scraping with subsequent transplantation frequently leads to recovery. Firm plugging often irritates too strongly. In some cases cicatricial bands are formed, behind which pockets appear; one may then use the chisel. It happens also that the bony surfaces become bent, particularly in the posterior portion of the tympanic cavity.

KRETSCHMANN also intended to discus the lower space of the tympanic cavity. He had operated upon it when diseased, at first with the chisel, later on with burrs, whereby he could better avoid injuries to the facial nerve. An injury to the lower parts is impossible on account of the crista and processus styloideus. He does not operate anteriorly.

18. HOFFMANN, Dresden.—**A Case of Empyema of the Sphenoid Cavity, with Consecutive Disturbance of the Eye of the Same Side.**

The disturbances of the eyes were objective; neuritis optica and paresis of several muscles. Subjectively, there existed a sensation of the eye being pushed aside and of decrease of sight. Operation according to Jansen without disfiguration. Recovery.

19. BÜRKNER, Göttingen, demonstrates an **Otiatric Pocket Case.**

20. JOËL, Gotha, presents a **Cast of Congenital Atresia of the Posterior Nares.**

21. PANSE, Dresden, exhibits a **Foot Button for Contact with Electromotor,** and various **Anatomical Specimens;** also a plainly constructed **Powder Blower.**

22. DENKER, Hagen, presents **Scissors for Adenoid Vegetations.**

23. HABERMANN, Graz, demonstrated a **Table of the Hearing Examination of a Female Patient, who had Become Deaf at Several Intervals in Consequence of Intense Mental Excitement.**

24. DENKER, Hagen.—Demonstration of **Corrosion Specimens of the Mammalian Ear.**

Of especial interest were the casts of the ear of the gorilla, polar bear, seal of Greenland, walrus, great kangaroo, ant-bear, leopard, and water-hog.

25. TREITEL.—**Injections of Pepsin for Improvement of Hearing.**

TREITEL has treated ten cases according to Cohen's method. The result was negative.

ON TYMPANIC NEURALGIA IN CONNECTION WITH ABSCESS OF THE TONGUE.—REPORT OF A CASE.

By Prof. O. KÖRNER, Rostock.

Translated by Dr. Arnold H. Knapp, New York.

A man, thirty-six years of age, was admitted to the clinic on September 2, 1896. Since his third year, after scarlet-fever, patient has suffered from a bilateral otorrhœa, with occasional pain in the ears. During the last two weeks he has had severe pain in the right side of the pharynx and in the right ear, which has been constant, and so severe that the patient was unable to take any nourishment, and became quite exhausted.

On examination, a glandular swelling, as large as a pigeon's egg, was felt between the right inferior maxilla and the hyoid bone. On slight pressure, the pain in the right ear was increased. The mouth could scarcely be opened. A dark-red, round swelling, as large as a walnut, was situated on the base of the tongue, between the epiglottis and the right anterior palatine arch. The lower two-thirds of both drum membranes were wanting; the tympanic mucous membrane was red, and covered with a slight amount of pus.

The swelling of the tongue opened during the examination, and thick, odorless pus was evacuated. This was soon followed by relief from the pain in the neck and the ear. The gland decreased in size, and the patient was discharged on September 9th.

This case presents various interesting features. First, was the pain in the ear due to the otitis media, or is this a case of tympanic neuralgia arising from the inflammatory process in the tongue? Tympanic neuralgia frequently accompanies affections of the tongue, especially cancer, where peritonsillar abscesses and ulcerations of the epiglottis are not uncommon. The tympanic mucous membrane was inflamed, and had previously caused pain; but against this origin of the pain is the fact that the pain in the ear was increased on pressing upon the glandular mass. The glands in this locality are involved in affections of the back teeth, as I have been able to observe on myself. About a year ago, I noticed a painful sensation near the extremity of the hyoid bone, which was made severer on swallowing, and radiated to the ear. After filling of a cavity in a wisdom-tooth, the pain disappeared. I have since then repeatedly observed the increase of pain in the ear in case of tympanic neuralgia from carious teeth, on pressure in the hyoid region. I consider this a diagnostic symptom.

Seifert has collected the literature on abscess of the tongue, and has rehearsed the symptoms, but he makes no mention of tympanic neuralgia. In a later observation Escat speaks of this symptom.

It is usually said that tympanic neuralgia from carious teeth is only seen in caries of the lower back-teeth. In the last two years we have paid special regard to this point, and found the supposition correct in all but one case. The upper teeth were frequently affected at the same time. Recently we have observed a case where the otalgia occurred in an affection of an upper tooth alone. The patient had lost all of the lower back-teeth and the second premolar and first molar of the upper jaw were carious.

NOTES ON A CASE OF MIDDLE-EAR AND MASTOID SUPPURATION IN A DIABETIC PATIENT, WITH REMARKS ON PERCUSSION OF THE MASTOID PROCESS.

By Prof. O. KÖRNER, Rostock.

Translated by Dr. Arnold H. Knapp, New York.

Mr. B., fifty-four years of age, consulted me on April 13, 1895. His previous health was good, though a splenic tumor has existed for nine years without causing any symptoms. Two years ago, the patient had an acute otitis on the left side, which was cured after paracentesis.

On April 3d, without known cause, the right ear became very painful; three days later otorrhœa set in, but the pain has persisted. On examination, I found a rather corpulent man, pale, and with coated tongue. The pulse was rapid, temperature normal. The coverings over the lower half of the mastoid process were œdematous, swollen, and tender. The auditory canal contained blood-stained pus. A pedunculated granuloma projected through a small perforation in the middle of the drum-membrane. The drum-membrane appeared thickened and superficially macerated; the hammer could not be seen.

The pain became less and the discharge more profuse after removal of the granuloma. On April 17th, the mastoid process was still swollen; the perforation was enlarged back and down. Three days later the pain and swelling had disappeared, and the discharge was no longer bloody.

Notwithstanding the local improvement, the patient's general condition failed visibly. The examination of the urine showed the presence of 5 per cent. of sugar, and a small amount of albumen, though the ferric chloride test proved negative. For two days the patient has been distressed with almost constant singultus. Pulse 120, respiration 24, temperature subnormal. The bacteriological examination of the aural discharge revealed the staphylococcus albus in pure culture.

On April 22d there was no return of the swelling over the right mastoid process, and the *percussion-note over both mastoid processes was exactly similar.* In the following days, the patient's general condition grew rapidly worse, with diarrhœa, attacks of vertigo, and slight delirium. The skin was cold and moist. The discharge from the ear though scanty again contained blood. Three litres of urine were passed in twenty-four hours, and contained 6½ per cent. of sugar. On May 8th the patient was stuporous; pulse 150, respiration 54. The two mastoid processes were alike on palpation. *Dulness on percussion over the right mastoid process, normal bony-resonance over the left.* The patient died in coma on May 8th.

Though we lack the confirmation of an autopsy or an operation, we may say with certainty that this was not a simple suppuration of the ear, but a process of a disintegration within the mastoid process. This is proven not only by the similarity of this case to those described in the literature and by me,[1] but also by the results of the percussion. Whenever the percussion-note of a bone changes from the normal to dulness during our observation and repeated comparison with the percussion of the healthy one, without a change in covering of that bone, some change in the interior of the bone has surely taken place.

In our case, an operative interference was out of the question, owing to the critical condition of the patient's general health.

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[1] KÖRNER, *Arch. f. Ohrenhlk.*, vol. xxix., p. 61. Körner and Von Wild, these ARCHIVES, vol. xxiii., p. 73.

THE DIAGNOSIS OF PERFORATION OF THE DRUM-MEMBRANE.

By E. BLOCK, of Freiburg.

Translated by Dr. Edwin M. Cox, of New York.

THE diagnosis of a perforation of the drum-membrane belongs, as a rule, to the easy tasks in otology. When the eye discovers in the depths of the auditory passage, a strip of the normal yellowish-white glistening tympanic mucous membrane, or the same membrane reddened, granulating, and covered with pus, it is evident that such can only be the case because there is a defect in the membrana tympani. And when, on the other hand, behind a well defined space in the surface of the membrana, the promontory is seen covered with grayish, dull-appearing, dry epidermis, we think in the first place not of a perforation, but of a depressed cicatrix. Even very diminutive perforations can, as a rule, be easily diagnosticated by monocular vision if they are filled with a drop of fluid such as pus, on the convex surface of which a small light reflex can be seen moving synchronously with the pulse.

There are, however, cases in which this sort of examination is not so easy or certain. Small deposits on the drum, a bit of dark cerumen, a foreign body, a little dried blood, a slight ecchymosis in the tissue of the membrana, or even cicatrices can form a picture which to the examining eye is deceptively like that of perforation. Traumatic ruptures of the drum, which have occurred from indirect violence (sudden and violent changes in air pressure, blows or falls on the head or ear), ruptures which we know heal spontaneously without suppuration, may present themselves at the time of our observation, in which case we are not in the position to decide from ocular evidence whether there is a perforation, or whether cicatrization is complete.

In doubtful cases, therefore, we made use of other means of diagnosis in determining the existence of a perforation. Frequently, it is possible to gain knowledge by means of the probe. With that instrument, obstructing substances can be pushed aside, and we can convince ourselves as to the intact condition of the drum-membrane. However, it is not advisable to use the probe in those cases in which we expect, with reason, a perforation, especially in traumatic cases, for when the perforation exists, the probe may easily introduce infective germs, and so interfere with the process of repair.

Even for the examination of a depressed cicatrix the instrument is not suitable, because with it we are not able to examine carefully enough the receding sides of the cicatricial cavity.

The probe is of no use in just those cases in which the ocular examination is also untrustworthy, and it has the further disadvantage that touching the drum-membrane in most people is unpleasant or even painful for them. If neither the eye nor the touch gives us the required information, we use the hearing: we direct a current of air against the drum-membrane and listen to the sounds caused by it. The air can be directed either from the auditory canal inwards or from the tympanic cavity outwards; let us consider the former way first.

We fix a rubber bulb in air-tight connection with the auditory meatus. Now, if we squeeze the bulb, no sound is heard if the membrane is intact, but if there is a perforation in the membrane, the air-current penetrates into the tympanic cavity and through the Eustachian tube into the pharynx. While the air is entering the pharynx, a slight crackling sound is heard by the observer if he puts his ear near the nose of the patient, or uses the stethoscope. The occurrence of this sound is proof of the presence of a drum perforation in those cases which we are now considering.

The absence of such a sound is, however, not proof of the absence of a perforation. In all cases the stream of air does not reach the pharynx. It is not that the wide pharyngeal end of the Eustachian tube is occluded in such cases, but that the lumen of the canal itself may be impassable to the moderate air-current which we may use in these cases. If the air-pressure becomes too great, a fresh yielding cicatrix or an atrophic spot may tear.

In case this procedure is unsuccessful, we make use of the more difficult and less agreeable catheterization. If it is successful, as is usual, the sharp, crackling sound peculiar to the small openings in the drum answers our inquiry in the affirmative, and from a simple blowing sound of air entering the tube we decide upon the absence of any defect. The method is much the most decisive of all, but in many cases is not the less unpleasant for the patient. Even in the most practised hands, the first introduction of the catheter is difficult and painful, and, for the purpose of a simple examination, is of doubtful benefit on this account. We must also remember that there are some cases in which the successful use of the catheter is impossible.

Substitutes for catheterization are not troublesome, but they have not the diagnostic certainty of the classical methods of air-distension.

The recognition of small and obscure perforations with certainty remains desirable. For this by a simple and not disagreeable method, I believe we must thank Siegle's speculum. This little instrument is used specially for observing the movability of the drum-membrane and its separate parts. If we put Siegle's funnel in position and rarefy the air in the auditory canal, in the presence of a perforation no displacement of the drum occurs. With perforations of the membrana flaccida we need not concern ourselves here; they are, perhaps, analogous to the others.

Why there is no displacement is easy to explain. If the drum-membrane is whole and we rarefy the air in the auditory canal, the air in the tympanum remains at a higher pressure, and the drum bulges outward on account of this difference in pressure.

If, however, there is a perforation of the drum, the rarefaction of the air in the canal causes a corresponding change in the tympanum, and consequently no displacement of the drum. The pressure remains the same on each side of the drum, and the cause for its displacement is not present. It is easy to convince ourselves of the correctness of this view by a simple model made of cardboard and paper in the form of an hour-glass-shaped tube with the membrane at the narrowest part, first with, and then without, a perforation.

REPORT ON THE PROGRESS OF OTOLOGY IN THE FIRST QUARTER OF THE YEAR 1897.

(*Concluded*)

BY DR. A. HARTMANN.

Translated by Dr. C. ZIMMERMANN, Milwaukee, Wis.

REPORTS.

NEW YORK EYE AND EAR INFIRMARY. 76th annual report, 1896. Ear Department. Drs. Bacon, Dench, Adams, Whiting and McKernon.

New Ear patients, 6485; house patients, 318; operations, 502; paracentesis mem. tympani, 151; removal of carious ossicles, 6; incision of furuncle, 54; mastoid operations, 124; operation for epidural abscess, 6; removal of thrombus of lateral sinus, 2; Stacke operation, 4; adenoids, 32; trephining for temporo-sphenoidal abscess, 2; trephining for lepto-meningitis, 2; trephining for depressed fracture of the skull, 1; excision of fibro-sarcoma of cheek, 1; excision of preauricular fibro-sarcoma, 1.

GORHAM BACON.

MASSACHUSETTS CHARITABLE EYE AND EAR INFIRMARY. 71st annual report, 1896. Ear Department. Drs. Blake, Green, Jack and Morse.

New Ear patients, 5545; house patients, 285; operations, incision of membrana tympani, 235; excision of carious ossicles, 18; removal of polypi, 108; adenoid operations, 94; mastoid, 73; trephining of temporal bone and exploratory acu-puncture of brain, 1.

GORHAM BACON.

NEW YORK OPHTHALMIC AND AURAL INSTITUTE. 27th annual report, 1896. Ear Department. Drs. Knapp, Tocplitz and Coburn.

New Ear patients, 1393; house patients, 33; furuncle of ext. aud. canal incised, 44; opening of mastoid cells, 23; epidural abscess, 1; Stacke operation, 1; operation (Kuster's) for thrombosis of lateral sinus, 1; ossiculectomy, 3; paracentesis mem. tym., 51; removal of adenoids, 90.

GORHAM BACON.

BROOKLYN EYE AND EAR HOSPITAL. 28th annual report, Jan. 1897. Ear Department. Drs. Prout, Mathewson, Sheppard and Alderton.

New Ear patients, 3705; paracentesis mem. tym. 18; polypi removed, 26; carious ossicles excised, 8; mastoid operations, 37; trephining of skull, 1; opening lateral sinus, 1; Stacke operation, 1; adenoids removed, 15. GORHAM BACON.

NEW YORK THROAT AND NOSE HOSPITAL. 5th annual report, 1896. Drs. Ramsdell, Reese, Reyling, Kinney and Smith, New Ear patients 171. GORHAM BACON.

NEW AMSTERDAM EYE AND EAR HOSPITAL. 8th annual report, 1896. Drs. Pooley and Myles. New ear patients, 402; house patients, 8; incision of furuncle, 1; paracentesis mem. tympani, 9; removal of polypi, 4; mastoid operation, 1.

GORHAM BACON.

NEWARK CHARITABLE EYE AND EAR INFIRMARY. Annual report for 1896. Drs. Kipp, Rankin, Eagleton and others.

New Ear patients 1504; number of operations, 101; paracentesis mem. tympani, 23; artificial perforation of mastoid cells, 14; removal of polypi, 13; incision of wall of ext. canal, 22; removal of adenoids, 5. GORHAM BACON.

METROPOLITAN THROAT HOSPITAL. 24th annual report, 1896. Drs. Wagner, Hope, and others.

New Ear patients, 920; Removal of polypi, 18; paracentesis mem. tymp., 24; opening of mastoid process, 3; excision of carious ossicles, 5; removal of adenoids, 91.

GORHAM BACON.

ST. MICHAEL'S HOSPITAL, Newark, N. J. Annual report, 1896. Dr. Sutphen.

New Ear patients, 823; operations, 13; operation for mastoid periostitis, 3; opening of mastoid cells, 4.

GORHAM BACON.

THE HARLEM EYE, EAR AND THROAT INFIRMARY. 15th annual report 1896. Dr. Meding.

New Ear patients, 451; removal of polypi, 4; post-auricular abscess, 1; Wilde's incision, 4; removal of adenoids, 30.

GORHAM BACON.

BALTIMORE EYE, EAR AND THROAT CHARITY HOSPITAL. fifteenth annual report, 1896. Drs. Theobald and Murdoch.

New Ear patients 535; opening mastoid process, 1; opening abscess of auditory canal, 10; paracentesis of mem. tympani 3; Wilde's incision, 2; removal of adenoids, 16.

GORHAM BACON.

MIDDLE EAR.

a. ACUTE OTITIS MEDIA.

22. STILLMAN, F. L. Report of a case of acute purulent otitis media complicated by retropharyngeal abscess. *N. Y. Med. Jour.*, Feb. 6, 1897.

23. EITELBERG, A., Vienna. Periostitis of the mastoid process in acute and sub-acute catarrh of the middle ear, with remarks on transient hardness of hearing in affections of portions of the hearing organ adjoining the middle ear. *Wien. Med. Presse*, 1897, Nos. 12 and 13.

24. HABERMANN, F. On affections of the petrous bone and the labyrinth following acute purulent otitis media. *Arch. f. Ohrenheilk.*, vol. xlii., p. 128.

25. PODACK, MAX, Dr. On the relations of the so-called morbillous croup and the affections of the middle ear following diphtheria to the diphtheria bacillus of Klebs–Loeffler. *Deutsch. Arch. für klin. Medicin.*, vol. lvi., p. 34.

26. LOEWENBERG, B., Dr. Bacteriological and clinical study of a new affection of the ear (auricular pseudo-diphtheria due to streptococci). *Le Bulletin Médical*, No. 19, 1897.

27. NICHOLS, JAMES E. H. Otitis media suppurativa acuta. Mastoid osteitis. Epidural abscess. Operation. Recovery. *Manhattan Eye and Ear Hospital Reports*, Jan., 1897.

22. The case reported was that of a man aged about forty and unmarried. He had had chronic catarrhal otitis media for some years, which was aggravated by a deviated nasal septum. When he first came under the writer's care he had a highly hyperæmic and bulged membrana tympani (left) which had followed a cold. He complained of deep pain in the ear. A paracentesis of the drumhead was performed, and there was an escape of considerable serum. The Leiter coil was applied. Six days later the temperature was normal, and he was allowed to go out on the fol-

lowing day. Four days after this the pain became severe in the ear again, and later the discharge was profuse. For the next two weeks he suffered considerable pain with some hemicrania on the left side. Temperature 103.^{8}. There were, however, no symptoms of mastoid disease. A free incision was made in the mem. tympani in its posterior half, with the idea that there might be insufficient drainage. The pain in the head was temporarily relieved, but on the following day was as severe as ever. The hemicrania was severe, the pain of which seemed to focus at the left side of the vertex and radiate towards the temple. The patient had difficulty in rotating the head, as the muscles in the back of the neck were stiff. He developed some symptoms of cerebral abscess, the pulse becoming very slow, but it was decided at a consultation that the symptoms could be accounted for by a localized meningitis. He was removed to a hospital six weeks after the beginning of the attack. At that time the temperature was normal; pulse 70. There was also some swelling of the neck in front of the sterno-mastoid and at the angle of the jaw. For about a week he had complained of sore throat, and there was some swelling in the left half of the soft palate and subsequently in the naso-pharynx. A diagnosis of retro-pharyngeal abscess was made subsequently and the pus evacuated. The patient finally recovered and the drum-membrane healed. In the writer's opinion, the pus gained access to the naso-pharynx along the sheath of the tensor tympani muscle. Gorham Bacon.

23. Eitelberg reports three cases of acute aural catarrh with periostitis of the mastoid process, which did not heal until after the abscesses were opened. Pollak.

24. Case 1: death from purulent meningitis after several operations. Suppuration of the labyrinth spreading towards the cranial cavity probably along the vessels of the fossa subarcuata. Case 2: man, aged sixty-nine, with paralysis agitans, died from marasmus eleven weeks after the commencement of the ear affection. No operation had been made. Pus in right antrum and inferior portion of the pyramid. Labyrinth free. Case 3: man, aged sixty-eight, with suppurative otitis media of right ear, ostitis and periostitis mastoidea. Died of pneumonia four months later. The bones of both pyramids very much inflamed, partially rarefied, partially infiltrated with new-formed bony substances. Case 4: laborer, aged fifty-eight, suffered for a month from otitis media and ostitis of the mastoid process of right ear, which led to per-

foration of the posterior wall of the canal. Trephining with removal of the posterior wall both on opening of an abscess in the lower portion of the petrous bone towards the jugular and the sigmoid fossæ. Continuous profuse suppuration. Death from marasmus a month after the first operation. Abscess cavity at the lower surface of the pyramid extending to the condyloid process and the apex of the former, bordering below on the soft parts and on the medial side on the jugular vein. This was a very rare form of secondary abscess, originating in the ear. Case 5 : man of twenty-four years with chronic otorrhœa of right ear and acute exacerbation after taking cold. The affection spread to the mastoid ; vertigo, nausea, vomiting, nystagmus, headache. Bulging of the posterior-superior wall of the canal and perforation of *Mt* at upper posterior quadrant. Yellow foci in some of the pneumatic cells, cholesteatoma in antrum and attic. Radical operation. After that the paralysis of facial and oculomotor nerves on left side, which had existed before, became at first more marked, but then partly disappeared. A persistent fistula in the depth of the cavity, exposed by the operation and surrounded by granulations, was opened later on as far as the wall of the sinus, but unsuccessfully, until finally an abscess cavity in the pars petrosa was opened. A portion of the cochlea became necrotic. The treatment is still continued, and recovery is expected. The very elaborate anatomical and histological details and two further briefly described cases have to be read in the original. BLOCH.

25. PODACK (from Lichtheim's clinic) proves that the croup in measles generally is a diphtheritic affection. In some cases no diphtheria bacilli are found in the pseudo-membranes, but other micro-organisms, mostly streptococci. Therefore pseudo-membranous laryngitis with diphtheria bacilli has to be distinguished from that with streptococci after measles. In one of the cases reported by Podack otitis media of both ears, with diphtheria bacilli without fibrinous or diphtheritic pseudo-membranes in the middle ear, the otitis media occurred two weeks before the other localizations of diphtheria became manifest. Podack admits the possibility that the diphtheria bacilli had nothing to do with the otitis media itself, but may be present only accidentally in the purulent discharge of an ordinary otitis media, acting simply as saprophytes.

In another case perforative otitis media with diphtheria bacilli of both ears co-existed with diphtheria of the fauces. At the post-mortem examination the mucous membrane of the tympanic cavity was converted into a multicellular granulation tissue, covered by more or less thick membranes, which, in sections, showed diphtheria bacilli and streptococci.

A very fine loose granulation tissue, with an abundant mucous intercellular substance, was found between the osseous tubercula of the right and left cochlea, and around the ganglion cochleare.

From the observations of Podack, the middle ear as well as the nasal cavity appears to represent an ominous haunt of the diphtheria bacilli of Klebs–Loeffler; they invade the middle ear more frequently than is generally supposed, and may remain there for weeks after diphtheria faucium. HARTMANN.

26. LOEWENBERG reports a case of diphtheria faucium with inflammation of the ear after using the nasal douche. Loewenberg examined this patient, who had suffered from excruciating pain for four days. Besides serious general symptoms there was a moderate sero-purulent secretion from the ear, and the meatus was filled with adherent membranes. The bacteriological examination revealed staphylococci in the pharyngeal secretion, streptococci in discharge from the ears, but no diphtheria bacilli. Sections of such a pseudo-membrane from the meatus showed pus corpuscles and streptococci all over. Loewenberg compares this condition with that of a laryngeal pseudo-membrane of genuine diphtheria, and concludes that the aural affection is a special disease, viz., a pseudo-diphtheria of the ear with streptococci, a membranous streptococci-otitis. HARTMANN.

27. The writer reports a case of a female, aged twenty, who had an attack of acute follicular tonsillitis, followed by an acute suppurative otitis media, with pain and tenderness over the mastoid. It was further learned that in a family quarrel the patient had been struck on the right parietal bone with a chair leg. The usual mastoid operation was performed, and pus, broken-down tissue, and carious bone were removed. About two months later the patient was discharged cured. Three weeks later, however, she returned, complaining of great pain in the mastoid region. A sinus was found in the former mastoid wound, extending inwards and discharging pus. The mastoid wound was reopened and enlarged and pus and granulations removed. A week after this, some swelling manifested itself in the scalp above and behind the upper end of the incision. Under ether, an incision was

made down to the bone and a portion of the parietal bone, 1 inch in length by ⅜ inch in breadth was found necrotic and loosened. On removing this, there was a gush of foul-smelling pus of about an ounce in quantity. The dura was thickened, but free from granulations. There seemed to be no connection between this and the wound in the mastoid. The patient recovered.
GORHAM BACON.

b. CHRONIC PURULENT OTITIS MEDIA.

28. GRANT, DUNDAS. Deafness arising from the residia of suppurative inflammation of the middle ear. *The Clinical Journal*, Dec. 28, 1896.

29. BARTH, A., Professor, Leipzig. Concrements in the ear in chronic purulent otitis media. *Monatschrift. f. Ohrenheilk*, No. 2, 1897.

28. DUNDAS GRANT dealt with abnormal conditions, such as losses of substance, cicatricial formations, and desquamative processes, which remain after the discharge has been stopped by treatment, or has subsided spontaneously. The paper is a careful and suggestive one, and exhibits the advances which are being made in the treatment of these cases. A. CHEATLE.

29. BARTH found in the meatus of a child, suffering from chronic suppuration of the middle ear, a plug of cotton covered with calcareous concrements. KILLIAN.

c. CEREBRAL COMPLICATIONS OF PURULENT OTITIS MEDIA.

30. NICHOLS, JAMES E. H. Otitis media suppurativa chronica; otitic brain abscess; operation; recovery. *Manhattan Eye and Ear Hospital Reports*, Jan., 1897.

31. BACON, GORHAM. Remarks on brain abscess in its relation to acute and chronic otitis media. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1897.

32. DENCH, EDWARD B. Intra-cranial complications of suppuration of the middle ear and mastoid. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1897.

33. ADAMS, JOHN L. A case of extra-dural abscess, following a mastoiditis. Operation; recovery. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1897.

34. McKERNON, J. F. Intra-cranial complications of middle

ear disease, with a report of cases. *N. Y. Eye and Ear Infirmary Reports,* Jan. 1897.

35. STARR, M. ALLEN. The diagnosis of cerebral abscess. *N. Y. Eye and Ear Infirmary Reports,* Jan., 1897.

36. STILLSON, J. O. Report of a case of double mastoid disease, followed by abscess of the spheno-maxillary fossa and neck. Recovery. *Annals of Otol., Rhinol., and Laryngology,* May, 1897.

37. STIRLING, J. W. Thrombosis of the petrosal, cavernous, and circular sinuses occurring in scarlet-fever, and due to acute suppurative otitis media. *Annals of Otol., Rhinol., and Laryngology,* Feb., 1897.

38. BAKER, ALBERT R. Pyogenic brain disease. *Annals of Otol., Rhinol., and Laryngology,* Feb., 1897.

d. MIDDLE EAR EXTENSION.

39. BARR, THOS. Case of chronic purulent inflammation of the middle ear on both sides, probably fatal by extension, on the left side, through the labyrinth and auditory and facial nerves to the interior of the cranium, with observations. *Glasgow Medical Jour.,* April, 1897.

40. WILLIS, MORLEY. A case of cerebral abscess, presenting unusual features. *Brit. Med. Jour.,* Feb. 4, 1897.

41. RIDLEY, BROOKE. Cerebellar abscess, following mastoid disease. Death. Necropsy. *Lancet,* Jan. 9, 1897.

42. WOLF, LUDWIG, Dr., Frankfurt a/M. A case of purulent thrombosis of the sinus transversus, with pyæmia, following acute purulent otitis media. Operation; recovery. *Monatschrift. f. Ohrenheilk.,* No. 2, 1897.

43. LACHARRIÈRE. Acute bilateral otitis media, thrombosis of the left lateral sinus, opening of the mastoid process, opening and scraping of the lateral sinus. Recovery. *Rev. hebdom de laryng., d'otol.,* March, 1897.

44. REVIÈRE and ETIÉVANT. Some cases of phlebitis of the sinus and of septico-pyæmia of otitic origin. *Arch. internat. de laryng., d'otol.*

45. LEUTERT, ERNEST, Dr. (from the Royal University Ear Clinic in Halle a/S.). On the value of the lumbar puncture in the diagnosis of intra-cranial complications of otitis. *Muench. Wed. Wochenschr.,* Nos. 8 and 9, 1897.

30. The history of this case was that the girl, aged thirteen years, had had chronic otorrhœa (both ears) for several years, and three weeks ago she seemed to have an acute attack of pain in both ears with some mastoid tenderness. There was discharge from both ears of foul-smelling pus and some granulations in the canals. Later there occurred drowsiness, a slight rise in the temperature, slight vomiting, slow pulse, slight facial paralysis (left side). Eight days after she entered the hospital she was etherized and a crucial incision 5 *cm* in length was made over the right temporal region above the temporal ridge. A button of bone was moved with the trephine and the dura found healthy. On enlarging this opening forward and downward, a quantity of thin, very offensive pus escaped. The dura was incised, and about two ounces of pus evacuated from the temporo-sphenoidal lobe. The cavity was washed out with a hot boric acid solution and a soft drainage tube inserted. The patient recovered. At the time of her discharge from the hospital there was a cerebral hernia at the site of the operation, which gradually diminished under the pressure of an elastic bandage worn continually. She left the hospital in February, and in August the writer received notice of her death, the cause of which was supposed to be due to some acute intestinal attack, although NICHOLS failed to obtain specific information. GORHAM BACON.

31. The paper consists in a brief review of five cases which have already been reported, viz., three cases of temporo-sphenoidal abscess, one case of cerebellar abscess, one extra-dural abscess.

In addition to these, a case of "probable cerebellar abscess" is given, as follows : A little girl, five years of age, who had had a chronic otorrhœa of two years' duration. Several months before this the child commenced to vomit, and for a week or so could retain no food. The vomiting was more or less cônstant until the time that she first came under observation. The child then had double-choked disc with retinitis. She had a staggering gait and could stand with difficulty when the eyes were closed. The canals were filled with pus and granulations. The latter were scraped away and free drainage established. The child was given iodide of potash and syr. of the iodide of iron. Under this treatment the child practically recovered. Of the five cases reported, in one the temperature was high and the pulse accelerated. In another case, besides a rapid pulse, there was such a fluctuation in the temperature that the case seemed at first to be one of lateral sinus thrombosis. In two of the cases there was but a slight elevation of temperature and a slow pulse. In the three cases of temporo-sphenoidal abscess, aphasic symptoms were marked. In only two of the cases was there inflammation of the optic nerve. In all cases severe headache was a constant symptom. In the three cases of temporo-sphenoidal abscess and that of cerebellar abscess the mastoid process was very dense.

The antrum should be opened first of all in a case of brain abscess and made the starting-point for further investigation. The operation should be performed as rapidly as possible and undertaken at an early stage, if success is to be attained.

GORHAM BACON.

32. DENCH reports five cases, two of which were published in the *Transactions of the American Otological Society* for 1896. Of these five cases, one was that of a man, about twenty-two years of age, who gave a history of chronic suppurative otitis of long duration. The mastoid was carious, and it was necessary to open the lateral sinus and to remove a thrombus. The sinus was packed with gauze. The patient recovered.

The second case was that of a man, about thirty years of age, who complained of severe pain about the left ear. Inspection of the drumhead gave negative results, and for six weeks various procedures were adopted but without any benefit. At this time there was tenderness over the mastoid. Temp. 99° F. Antrum was opened and bone found softened. The lateral sinus was exposed and found empty. The bone along the sinus was removed down to the jugular fossa. "The patient had evidently suffered from a localized purulent meningitis, the infected area having been shut off from the general cranial cavity by adhesive inflammation." Recovery followed.

A third case was that of a child, two months old, who had an acute suppurative otitis media. The mastoid became involved. The abscess was opened and the antrum reached. There was extensive caries, so that it was necessary to expose the dura. For the next four days the condition of the patient was improved except that the temperature was high. On the fifth day the child seemed dull, and on the following morning signs of left facial paralysis were noted. The opening was found in the dura, and some thick pus was evacuated from the brain itself. Improvement in the child's condition was but temporary. The patient died. No autopsy could be obtained.

The two cases previously reported were both successfully operated upon. One was that of a young man, eighteen years of age who had chronic sup. otitis media. On opening the mastoid, which was carious, there was found thrombosis of the lateral sinus. The thrombus was removed. The other case was one of infective lepto-meningitis following a chronic middle-ear suppuration in a man sixty years of age. GORHAM BACON.

33. The patient, a man, fifty-five years of age, was seen November 7, 1895. He had a chronic suppurative otitis media of five months' duration. There had been severe pain for some time about the ear and for the past ten days there was marked swelling and tenderness over the mastoid. There was a profuse discharge from the ear, and the posterior wall was swollen and boggy. The drumhead was mostly destroyed. Temp., 100.2° F. The mastoid was opened. The antrum was filled with pus and granulation tissue. A communication was established with the middle ear. The temperature remained above normal for several days after the operation. The wound was healed on January 1, 1896. On January 14th, however, the patient returned, as the sinus over the mastoid had reopened and he began to have severe pain in the side of head extending to the frontal region. As the pain persisted and there was a free discharge of pus from the sinus, a further operation was undertaken on January 30th. A free incision was made, so that the whole mastoid process was exposed. The sinus was found to extend to the dura. The latter was found thickened and covered over with a thick fibrinous exudate over a space two by three inches in diameter. Granulation tissue was removed. An aspirating needle was plunged into the brain, but no pus was found. In reporting this case, ADAMS says that it is his object "to emphasize the fact that in removing diseased tissue great care should be taken to remove it all, and avoid the danger which may result from a neglect to do so." He further thinks that "had he made a more thorough investigation and removed more of the remaining diseased tissue, the probability is that a second operation would not have been required." GORHAM BACON.

34. CASE I. Thrombosis of lateral sinus complicating acute mastoiditis due to middle-ear suppuration; operation; recovery. The patient, a young man, seventeen years of age, had an otitis media of five weeks' duration, followed by mastoid inflammation (right). Later he had a chill, high fever, and vomiting. An

ice-coil was applied, and some improvement followed for a time, but when seen by McKernon there was a copious discharge from the canal through a small opening in the drumhead. There was bulging of the drumhead. There was also tenderness over the mastoid. A free incision was made in the mem. tympani and the Leiter coil applied. It was necessary, however, to open the mastoid cells. Pus was found in the antrum. The pneumatic spaces were completely broken down even to the tip. The sinus was exposed and opened, and found to contain a thrombus. A free flow of blood was established at each end of the incised sinus. The patient made an excellent recovery.

Case 2. Epidural abscess following chronic mastoiditis due to middle-ear suppuration ; operation ; recovery. The patient was a Russian, aged fifteen, who had an attack of scarlet-fever a year previously, followed by meningitis. As a result he was a deaf-mute. When six years of age he had a discharge from both ears, and later a swelling behind the right ear. When he came under the writer's observation, there was a very small and contracted meatus and canal. Behind the ear (right) was a large, boggy swelling in the mastoid and a sinus below at the tip. The boy's condition was serious. Under ether, a free incision was made over the mastoid process. The latter was found broken down and necrotic, and only the inner table of the tip was present The wall between the antrum and the lateral sinus was necrotic and this was removed. The middle central fossa was opened and an extra-dural abscess found. The wound healed completely, and there was no discharge from the ear. The hearing was negative.

Case 3. Epidural abscess following acute mastoiditis; operation; recovery. The patient, a man, aged thirty-one, had suffered from chronic otorrhœa for some years. He contracted a cold, and the discharge from the ear ceased while symptoms of mastoid disease developed. He was admitted to a general hospital, where the mastoid process was opened. Later he came under the writer's care, at the Eye and Ear Infirmary. Here the mastoid cells were thoroughly exposed and all diseased tissue removed. Directly over the centre of the lateral sinus the bone was very soft, and pus was found beneath its surface. The patient recovered. Gorham Bacon.'

35. In this paper Starr first refers to cases of brain abscess due to traumatism that have come under his observation, and

afterwards to cases of abscess following disease of the ear. The writer says that "in the diagnosis of abscess of the brain the combination of the symptoms, rather than the existence of any one symptom, is of the greatest aid." In the preliminary period, paroxysmal pains and a dull ache in the head, occasional vomiting, and a lack of power of concentration, with mental fatigue developing easily and unusually, are the chief symptoms. During this period there may be chilly sensations or a distinct chill, with rise in temperature. The discharge from the ear may be copious or very scanty. Sometimes the discharge ceases suddenly. A sudden cessation of the discharge and a sudden fall in the temperature to a point below normal two or three days after the discharge has ceased are symptoms quite characteristic of the formation of an abscess, especially if the patient continues to feel ill with indefinite cerebral sensations. In the second stage the symptoms usually observed are increasing mental stupor, irritability, restlessness, general septic appearance of the patient, with irregular or low temperature, persistently slow pulse, serious disturbance of digestion, difference in the size of the pupils, optic neuritis, facial palsy, increase of reflexes in the limbs of the side opposite to the lesion. In abscess of the temporo-sphenoidal lobe of the left side a certain form of aphasia, called optical aphasia by Freund, is a most important symptom when present. This consists in an inability to name objects which are seen and recognized, and whose use can be described. Prof. Arnold Pick has described fully this symptom of optical aphasia, and made it the basis of a diagnosis of localization of a cerebral abscess, which the operation confirmed. In left-handed persons this symptom will occur in abscess of the right side.

Starr concludes by saying "that when a cerebral abscess seems probable from the history of a case and from the symptoms which have developed, it is advisable to operate, even though the symptoms may not be absolutely typical, and may present many variations from their usual form, provided the general progress of the case demonstrates the existence of an increasing and serious focal disease of the brain. The rapidly increasing percentage of recoveries after operation warrants a degree of boldness, provided the surgeon is careful in the observance of every rule of asepsis, without which precaution such a venturesome operation would be criminal." GORHAM BACON.

36. The case reported was that of a woman, of middle age, who

had an attack of influenza in February, 1896. Shortly afterwards both ears became affected. At first a free incision was made in each drumhead and antiphlogistic treatment carried out. It became necessary, however, to open both mastoid processes. The case was further complicated by an abscess in the antrum of Highmore. Pus burrowed down beneath the sterno-mastoid muscle, and it was necessary to open an abscess deep down underneath this muscle. The result in this case was that good hearing was obtained, and the patient's health a year afterwards was excellent. GORHAM BACON.

37. STIRLING's patient, a boy, seventeen months' old, developed acute suppurative otitis media during an attack of scarlet-fever. The left ear was affected, and the tissues over the mastoid antrum were œdematous. An incision was made through the tissues, and a portion of the posterior wall of the external meatus cut away. Three days later œdema of the left upper eyelid developed, and one day later the right upper eyelid began to swell. The child became comatose. The temperature fluctuated very much, rising as high as 104.6° F. Death occurred. There was found at the autopsy thrombosis of the left sup. petrosal sinus, the cavernous, and circular sinuses. GORHAM BACON.

38. In this paper BAKER gives a report of sixteen cases of cerebral disease following disease of the ear. Of this number, there were eight cases of cerebral abscess, with three deaths; five cases of sinus thrombosis, with one death; three cases of meningitis, all of which were fatal. The writer says that so far as possible "the infective area was cured by curetting and draining," and further that "the boldness with which the general surgeon opens the cerebral cavity in his efforts to discover and drain cerebral abscesses, and the perfunctory way in which he passes over the source of the infection in the middle ear, is a dangerous practice."

GORHAM BACON.

39. A boy, aged seventeen years, who had suffered with discharge from both ears for seven years, came to BARR in 1894. A perforation in Shrapnell's membrane on each side was found, and, as little effect was produced by ordinary treatment, Barr proposed to open and clear out the antrum and attic on the left side, which was the one more seriously involved. This proposal did not gain the assent of the parents. The patient came again in September, 1896, with intense pain in the left ear and side of

head, and profuse and offensive discharge on both sides. There was buzzing in the left ear, in which a polypus was found; occasional giddiness was complained of. The hearing for a 70-inch watch was 10 inches on the right side and 0 on the left. The polypus was removed under chloroform, and a carious condition of the posterior meatal wall found. The antrum and attic were opened, and cleared of cario-necrotic débris, granulation tissue, and cholesteatoma. Improvement for a few weeks followed these procedures; but slight headache in frontal and occipital regions then came on, and a temp. of 100°. The boy then became suddenly ill with violent sickness, delirious excitement, and a temp. of 102°. Nicoll then opened the cranium, exposing the sigmoid sinus and the dura mater of the middle fossa, but nothing was discovered. Some improvement followed, the temperature became normal, and the child looked better, but left-sided facial paralysis was noticed. Examination of the eyes by Thomson showed the right disc slightly hyperæmic; the left disc very hyperæmic; physiological cup obliterated, upper and lower edges obscured; the whole disc prominent; the surrounding retina somewhat œdematous. The left eyeball appeared rotated upwards relatively to the right. Diplopia was present, chiefly marked in the middle line, consisting of a lateral and vertical element. A week later the patient suddenly became gravely worse, with delirium, unconsciousness, rapid pulse, and temp. of 104° to 106°; death occurring within eight hours. At the post-mortem the left temporal bone showed part of tympanic wall of labyrinth destroyed by caries, perforation in upper part of membrane, with loss of incus and stapes. A large cavity lined by soft membrane occupying the petrous part continuous with the antrum, the result of necrotic destruction of the whole labyrinth; the only trace of the labyrinth being a small, loose sequestrum consisting of a portion of the cochlea. In the roof of this cavity, corresponding to the position of the cochlea, was a carious opening, penetrating the bony floor of the middle fossa, covered by healthy dura mater. The cribriform lamina eroded away, the auditory nerve presenting an abrupt and ragged ending, the stem being much thickened. The facial nerve in the internal meatus was inextricably united with the auditory and sharing its thickening and swelling. At the geniculate ganglion the nerve was denuded of its bony covering by caries, and at the posterior part of the inner tympanic wall the nerve was entirely destroyed. In the cranium the dura mater was normal, but in the meshes of the pia arachnoid on the concavity of the cerebrum was an extensive fibrinous exudation; the same condition existing at the base of the brain. On the posterior part of pons and anterior part of medulla, both on the left side, the exudation was very marked, entangling the 6th, 7th, 8th, 9th, and 10th nerves. At the hinder part of the cerebellar hemispheres the exudation appeared in little elevated masses. The cerebellum, where overlapped by the 7th, 8th, and 9th nerves at the anterior part of the lateral lobe, just as it lies in contact with the posterior surface of the pars petrosa, was superficially ulcerated, and fœtid pus was seen to extend mesially and deeply into the cerebellar tissue.

40. WILLIS reports a case which was under Chalmers Norton's care. A child, of eight years, who, after an otitis media suppuration developed symptoms of meningitis, which gave place to those of cerebral abscess. The abscess was found and drained. On two occasions in attempting to replace the canula in the cavity, arterial blood was forcibly ejected. Recovery occurred.

ARTHUR CHEATLE.

41. In RIDLEY'S case a boy, aged fourteen years, had suffered with discharge from the right ear for seven years after an attack of measles. Symptoms of mastoid trouble supervened, and an abscess formed behind the ear; on opening the abscess a carious track was found leading to the antrum. Improvement occurred, but later the child, became seized with rigors, diarrhœa, and vomiting. These symptoms, with the exception of the vomiting, were replaced by subnormal temperature, slow pulse and respirations, slow cerebration, staggering gait, constipation, and extreme tenderness over the right occipital region. Cerebellar abscess was diagnosed, but the parents refused operation. No optic neuritis or ocular paralysis noticed all through. Death occurred suddenly. At the post-mortem examination a large abscess was found in the anterior and outer portion of the lateral cerebellar lobe. No meningitis. Lateral sinus normal. CHEATLE.

42. The operation was performed when the pyæmic symptoms had just begun. The sinus contained a sanguinolent purulent fluid and thrombotic coagula, not offensive. In removing them, a hemorrhage occurred from the peripheral portion of the sinus, which was stopped by tamponades. No ligation of the external jugular vein. In the further course metastatic abscesses supervened on the left upper arm, neck, and above the right sterno-

clavicular joint. The abscess of the neck was deeply situated behind the sterno-cleido-mastoid muscle, contained very offensive pus and gas, and probably originated in the internal jugular vein. KILLIAN.

43. Bilateral otitis in a child, aged twenty-two months, with perforation on the fifth day. On the 10th day chills, on the 11th day inflammatory œdema of the left upper eyelid, on the 15th day operation. Pus was found in the antrum and a bland thrombus in the sinus. Scraping and cleansing; recovery. ZIMMERMANN.

44. The three cases observed by the authors ended fatally. The mastoid process had been opened and scraped as far as the sinus, without ligation of the jugular vein. In the fourth case a fistula was opened which had existed for months, leading into the sinus. The sinus was obliterated, and consisted of "fibro-caseous" material. The authors add some remarks on the diagnostic difficulties of such cases, and call attention to a new pathognomonic symptom, viz., the occurrence of profuse hemorrhages from the meatus. ZIMMERMANN.

45. The puncture of the lumbar vertebral column, described by QUINCKE, was performed on twelve patients in all, in the ear clinic at Halle. In all five cases of diffuse purulent meningitis (of which three were complicated by thrombosis of the sinus or cerebral abscess) the liberated fluid was opaque. The same was found in a case of epidemic cerebro-spinal meningitis, but it showed more micro-organisms than the other cases. In a case of serous meningitis (clear œdema of the pia mater), the fluid was not perfectly clear, but contained rods, which, perhaps, might be taken for accidental impurities. Only in a case of encapsulated meningitis (complicated with thrombosis of the sinus and cerebral abscess) and a case of tubercular meningitis the fluid, obtained by punctures, was perfectly clear. In the latter, however, it was opalescent, but no tubercle bacilli of Koch could be found. In the remaining three cases of thrombosis of the sinus, or perisinuous abscess (this case recovered) and cerebral abscess, which were not complicated with meningitis, a clear fluid was obtained by this puncture.

In one case the puncture and aspiration were followed by immediate death, as observed before by other authors. LEUTERT is fully aware of the danger of a puncture in advanced cases of cerebral tumors and meningitis, but thinks it to be of no practical consequence, since the patients are doomed. [This, however, does not hold good in cases of cerebral tumor.—Reviewer]. Further observations must show how cases of cerebral abscess and thrombosis of the sinus will be affected by it. The dangers of the puncture may probably be diminished by manometry.

The authors so far considered, almost without exception, the positive symptoms. Leutert, however, emphasizes, that in otology the chief stress has to be laid on the negative symptoms which exclude diffuse purulent meningitis, at least when *large* quantities of fluid are present, and thus facilitate the diagnosis of the remaining intracranial complications.

In the uncomplicated cases the fluid was clear, but its quantity increased. From reasons given in the *Archiv. für Ohrenheilkunde*, vol. xli., the author thinks that, if these conditions proved generally to accompany the thrombosis, the diagnosis of thrombosis of the sinus could be made with certainty from the increased pressure associated with high fever. The lumbar puncture may also support the diagnosis of cerebral abscess.

Pathologically, the formed elements of the fluid drawn off are most important. The author thinks that not only the presence of polynuclear leucocytes, but also an increase of the number of leucocytes make the diagnosis of meningitis at least very probable. In regard to micro-organisms, the simple microscopic examination is more important than cultures or experiments on animals.

The patients were always laid on the side in performing the puncture. Leutert recommends to have needles ready of a length up to 13 *cm*, as in one case a length of 7 *cm* proved insufficient.

The reviewer observed a case in which this diagnosis was corroborated by the lumbar punctures. It was followed by a remarkable, but transient, improvement, contrary to the experience made in the clinic at Halle. SCHEIBE.

d.—OTHER AFFECTIONS OF THE MIDDLE EAR.

46. BRUCHL, Dr. E. On the treatment of adhesive processes of the middle-ear with thyreoidin. *Monatsschrift f. Ohrenheilk*, No. 1, 1897.

47. KOERNER, Prof. O., Rostock. Remarks on tympanic neuralgia in connection with the report of a case of abscess of the tongue. These ARCHIV., vol. xxvi., No. 4.

48. ALDERTON, H. A. Toxic paralysis of the chorda-tympani

nerve in middle-ear operations from the use of strong cocaine solution. *Annals of Otol., Rhinol. and Laryngology,* Feb., 1897.

49. Cowen, William. A case of objective tinnitus of the ear. *N. Y. Eye and Ear Infirmary Reports,* Jan., 1897.

50. Duel, Arthur B. The rapid dilatation of strictures of the Eustachian tube by electrolysis. *N. Y. Eye and Ear Infirmary Reports,* Jan., 1897.

46. Out of 16 cases 8 remained in the same condition after six to eight weeks' treatment; in 4 there was an improvement of hearing; 2 yielded very good results, viz., an improvement of from ½ to 7 *m* for loud speech and from 10 to 100 *cm* for the acoumeter. Bruchl attributes the result to the action of iodine contained in thyreoidin. Killian.

48. Alderton reports a case of paralysis of the chorda-tympani nerve, which he believes was due to the action of a strong fresh solution of cocaine hydrochlorate, which had spread so as to involve the nerve in its influence. The paralysis persisted for less than twenty-four hours, and disappeared without sequelæ. Gorham Bacon.

49. In this case the drumhead was found normal as well as the hearing distance. A diagnosis of aural catarrh was made and the patient treated in the usual way, as there was a surging noise in his ear. A clear musical note could be heard on applying a stethoscope to the auricle, or better by inserting a rubber tube into the auditory canal. The note was synchronous with the heart beat, and could be stopped every time by making slight pressure upon the carotid vessels. The sound was only heard through the auditory canal, and was undoubtedly produced by some circulation error. The patient was about forty-two years of age, and in good health. A careful examination for valvular anomalies or aneurismal conditions of the large vessels was made without any results. Gorham Bacon.

50. The writer in this paper reports the results obtained in ten cases of stricture of the Eustachian tube. He describes at length the apparatus used, which consists of copper bougies which are passed through silver catheters. The Eustachian tube is bougied in the usual manner, the tip being pushed forward until it is felt to be obstructed by the constriction. The current is then turned on slowly, until from two to five milliamperes are used. After a contact of from two to five minutes the bougie is felt to pass on through the softened stricture with a slight pressure. Gorham Bacon.

NERVOUS APPARATUS.

51. KAUFMANN, Dr. DANIEL. On a case of complete deafness of both ears three days after a fall on the occiput. Contribution to the study of concussion of the labyrinth. *Wien. Medic. Blaetter*, No. 1–4, 1897.

52. HOLINGER, J. Diseases of the labyrinth. *Annals of Otol., Rhinol., and Laryngology*, May, 1897.

53. KAUFMANN, Dr. DANIEL. On a case of monolateral acute affection of the 8th, 7th, and 5th nerves. These ARCHIVES, vol. xxvi., No. 4.

51. A boy, aged thirteen, fell on the occiput while exercising in the gymnasium. Vertigo, consciousness preserved; in the following two days vomiting, headache; on the third day sudden deafness of both ears. The examination revealed infraction of the right parietal bone with hæmatocele (meningocele spuria), and complete deafness on both sides. KAUFMAN diagnosed an affection of the labyrinth due to cerebral concussion, excluding a central or medullar affection, as well as a fracture of the base of the skull on both sides. He attributes the secondary deafness to a so-called secondary traumatic apoplexy (Bollinger, Michel).

Extensive literature on the condition of the hearing organ in injuries of the skull. POLLAK.

52. HOLINGER reports three cases of traumatic disease of the labyrinth. The first case was that of a man, twenty-six years of age, who three years previously was thrown from his horse. He was unconscious for some time afterwards. He then complained of great deafness and dizziness. After some weeks there was improvement, and he was able to hear loud conversation.

The second case, a man, forty-five years of age, attempted suicide by shooting himself in the left ear. He developed a staggering gait in walking. There was also great deafness and complete paralysis of the muscles of the left side of the face, The drumhead was destroyed, and the bullet was found in the middle ear. From the position of the latter, it is probable that the cochlea and greater portion of the vestibulum were destroyed.

The third patient, a man, nineteen years old, fell a distance of sixteen feet, and was unconscious for two weeks. He had great dizziness and subjective noises. There was a discharge of pus from the ear. Subsequently tenderness over the mastoid developed. There was probably a fracture through the labyrinth. The patient was very deaf, and bone-conduction was lost.

GORHAM BACON.

NOSE.

a.—GENERAL PATHOLOGY OF THE NOSE.

53. PLAGET. On the protection of the nasal cavity against invasion of micro-organisms. *Ann. des mal. de l'or., du lar.*, Feb., 1897.

54. VAUSANT, EUGENE L. Bacteriological investigations of the nasal mucus in one hundred cases of chronic nasal discharge. *Journ. Amer. Med. Assoc.*, Feb. 27, 1897.

55. MEYER, EDMUND, Berlin. Bacteriological conditions in rhinitis fibrinosa. *Arch. f. Laryngol.*, iv., 2.

56. PRIBARY. Clinical and anatomical contributions to rhinitis sicca anterior. (From the polyclinic of Prof. Siebenmann at Basel). *Archiv. f. Laryngol.*, iv., 3.

57. LACOARRET. Anatomy and pathology of the inferior turbinated body, its hypertrophy, and benign degenerations. *Rev. hebdom. de laryng. d'otol.*, Feb., 1897.

58. BRONNER, A. Asthma and hay fever of nasal origin. *The Medical Press*, Jan. 27, 1897.

59. LUZATTI. On a light form of psychical excitation due to an endo-nasal operation. *Ann. des mal. de l'or du larynx*, Feb., 1897.

60. LANGE, Dr. VICTOR. On adenoid habitus. *Berl. Klin. Wochenschr.*, No. 1, 1897.

53. PLAGET confirms Lermoyez's assertion of the bactericidal action of the nasal mucus. Cultures from mucus of the posterior portions of the nose remained sterile, and nasal mucus added to bouillon cultures of various micro-organisms checked their growth. The experiments are briefly reported.

ZIMMERMANN.

54. Among a hundred patients with chronic nasal catarrh examined bacteriologically, the diphtheria bacilli were formed in thirty cultures of twenty-six different patients, of which eleven were cases of atrophy, three of chronic suppuration, five of chronic rhinitis, three of syphilis, one of acute rhinitis, and three of chronic hypertrophy. M. TOEPLITZ.

55. After giving the clinical differential diagnosis of rhinitis fibrinosa and rhino-diphtherica, MEYER reports the results of the bacteriological examination of twenty-two cases of fibrinous rhinitis. He found in nine cases the ordinary nasal bacteria, streptococci, of no great virulence, and staphylococci (albus and aureus); in thirteen virulent diphtheria bacilli.

There being no clinical difference between the cases with and without diphtheria bacilli, Meyer concludes that rhinitis fibrinosa is etiologically not a disease proper, but a symptom of an infection due to diphtheria bacilli, or other micro-organisms, particularly streptococci and staphylococci. ZARNIKO.

56. PRIBARY sums up his investigations in the following manner: 1. Rhinitis sicca anterior is an atrophic rhinitis sicca of the cartilaginious system. The xanthosis of Zuckerkandl is one of its features. 2. It is the chief etiological movement for habitual epistaxis and perforating ulcer, probably also for the easily bleeding polypus of the septum. 3. Rhinitis sicca anterior predisposes the nose to infection by tuberculosis, syphilis, erysipelas, and suppurative perichondritis septi. 4. Histologically the mucous membrane contains numerous cells in the process of hyaline degeneration, "Mastzellen," and few eosinophile cells. 5. Very much pigment within and outside the cells, originating from the blood, shows characteristic red-brown color when stained with carbol-fuchsin. 6. A peculiar substance covering and infiltrating the superficial cellular layer is found in the mucus of the altered mucous membrane, the ciliated epithelium of which is transformed into pavement epithelium with a corneal stratum. This substance reacts to staining fluids like kerato-hyaline, and its decomposition probably is the cause of the characteristic odor of the atrophic nasal mucous membrane. [The reviewer never noticed this odor in rhinitis sicca anterior or perforating ulcer]. It covers the mucous membrane like varnish, and by spreading into the uppermost layer of the cells, it probably causes the vulnerability of the mucous membrane. 8. The normal septum has only a small area of pavement epithelium at the junction of the mucous membrane and the epidermis, otherwise it has ciliated stratified epithelium. ZARNIKO.

57. LACOARRET claims an anatomical difference for the lower turbinated body from the others; not only because it develops from a separate bone, but also because it is characterized by its stratified epithelium, its dense cavernous tissue, and its abun-

dance of lymphoid tissue. The same difference exists clinically; the smooth and papillary hypertrophy and the myxomatous and fibromyxomatous degeneration are met with only on the lower concha. ZIMMERMANN.

58. At a meeting of the Bradford Medico-Chirurgical Society, held on January 12, 1897, BRONNER related that asthma and hay fever may be of nasal origin.

1. As a direct result of nasal obstruction.

2. As the result of irritation of the endings of the 5th nerve by polypus, atrophy, or hypertrophy of the nasal mucous membrane, foreign bodies, or by necrosis of bones of the nose.

3. As the outcome of a central neurosis, in which case the cautery gave relief by acting as a counter-irritant.

He advocates examination of the nose in all cases.

ARTHUR CHEATLE.

59. Psychical excitations, of one day's duration, occurred in a hysterical woman, aged thirty-five, after removal of a hypertrophied portion of the lower turbinated body—without cocaine.

ZIMMERMANN.

60. LANGE asserts that the "adenoid habitus," at first described by Meyer, is not absolutely pathognomonic of adenoid vegetations. Quite a number of patients did not lose this habitus even after removal of the pharyngeal tonsil with improvement of nasal breathing and speech. Others show adenoid habitus who never had adenoid vegetations. Although these children, who also show neuropathic symptoms, belong to the typical cases of Meyer, they generally are partially or totally degenerate from birth, some of them exhibiting external symptoms of degeneration (abnormally developed skull, etc.). The adenoid habitus of the typical cases is due to the adenoid vegetations causing a mechanical impediment to the communication of the lymph channels of the naso-pharynx with those of the brain. In the former cases Lange obtained good results by continued administration of arsenic and proper psychical treatment. He recommends the education of such children in intelligently conducted institutions.

MÜLLER.

b.—THERAPEUTICS OF DISEASES OF THE NOSE.

61. FORSELLES, DR. ARTHUR. On tamponade of the nose in severe epistaxis. *Monatschr. f. Ohrenheilk.*, No. 2, 1897.

62. BRUCK, DR. F. On the treatment of genuine ozæna. *Berl. Klin. Wochenschr.*, No. 3, 1897.

63. SAENGER, Dr. M. On the treatment of ozæna. *Berl. Klin. Wochenschr.*, No. 3, 1897.

64. RÉTHI, Dr. L., Vienna. The healing of ozæna by electrolysis. *Wien. Klin. Rundschau*, No. 10, 1897.

65. SHASTID, THOMAS H. Eucaine in atrophic rhinitis. *Medical Record*, April 10, 1897.

61. FORSELLES considers the posterior tamponade necessary in cases of severe epistaxis from the middle and posterior portions of the nose, and uses a tampon of iodoform gauze, which must not project from the channel into the naso-pharynx. Styptics, especially perchloride of iron, are to be discarded. KILLIAN.

62. BRUCK confirms the favorable results of the tamponade according to Gottstein's method. But he is against the method of Saenger and Kafemann recently devised, which aims to increase the intensity of the respiratory changes of air pressure and thus the circulation and secretion of the mucous membrane, either by alternating closure of the nostrils with cotton or by artificial stenosis of the nostrils by an apparatus. In Bruck's opinion the tamponade acts as drainage, and by mechanical irritation, which in Saenger's method is limited to a small area of the atrophic mucous membrane. There is no drainage if an apparatus is employed. Gottstein's tamponade is also a useful symptomatic procedure in other fetid suppurations of the nose, *e. g.*, in empyema of the accessory cavities. Bruck modified Gottstein's method by applying a strip of gauze directly to the whole mucous membrane of *both* sides in such a way that *nasal* breathing is not interfered with. If the gauze is soaked with secretion it may be renewed by the patient. The gauze stimulates and absorbs the secretion, at the same time heating, purifying, and moistening the inspired air. In more severe cases Bruck combines it with Gottstein's method. It must be used continuously in order to avoid relapses. MUELLER.

63. SAENGER attributes the unfavorable results obtained by Bruck with Saenger's nasal obturator to lack of technique, and disputes the assertion of Bruck that his method acts only by mechanical irritation. From physical laws Bruck's statement is wrong that the inspired air becomes heated by passing through the gauze as used by Bruck. MUELLER.

64. RÉTHI saw very good results from electrolysis in the treatment of ozæna, which acts almost as a specific. From this he concludes that ozæna has to be considered as a trophoneurosis.

POLLAK.

65. SHASTID claims that by applying freely every day a five-per cent. solution of eucaine, the mucous membrane in atrophic rhinitis becomes fuller and more vascular. M. TOEPLITZ.

c.—NASAL SEPTUM.

66. LACROIX. Spontaneous readjustment of the septum by simply removing obstructions of the other nasal cavity. *Arch. internat. de laryng. d'otol.*, x., 1.

67. MCCASSY, J. H. Deformities of the nasal septum. *Journ. Amer. Med. Assoc.*, Feb. 6, 1897.

68. GOUGUENHEIM. On abscesses of the nasal septum. *Ann. des mal. de l'or. du laryng.*, Jan., 1897.

69. DANZIGER, Dr. FRITZ, Beuthen. The so-called idiopathic perichondritis of the nasal septum (spontaneous hæmatoma). *Monatschr. f. Ohrenheilk.*, No. 1, 1897.

70. TURNER, LOGAN. Specimen of papilloma of septum nasi. *Proceedings of the Laryngological Society of London*, Dec. 9, 1896.

71. GRIFFIN, E. HARRISON. Deformities of the nasal septum. *New York Med. Jour.*, June 12, 1897.

72. BUTTS HOYLE, H. An operation for the correction of external and internal deformities of the nose. *New York Med. Jour.*, May 22, 1897.

73. ANDERSON, P. L. A modification of Bosworth's nasal and aural snare. *Journ. Amer. Med. Assoc.*, April 10, 1897.

74. MILLER, VICTOR. Ozæna. Necrosis of nasal septum. Ethmoiditis, etc. Brain complication. Death. *British Med. Jour.*, April 10, 1897.

66. Both nasal cavities of a patient were almost totally impermeable; the left by a globular bulging of the septum, the right by a spina and numerous mucous polypi. After removal of the latter, the left side became also permeable by spontaneous re-adjustment of the septum. LACROIX thinks that this occurs frequently. ZIMMERMANN.

67. MCCASSY removes a stellate portion of the septum and holds the fragments together by a clamp tightened by screws. M. TOEPLITZ.

69. DANZIGER does not believe in the occurrence of primary perichondritis of the nasal septum. It is due either to influenza or to a nasal affection which may lead to an infection of excoriated points of the septum. KILLIAN.

70. Logan Turner showed macroscopical and microscopical preparations of a tumor removed from the right nasal fossa. A man, aged fifty-two years, complained of complete obstruction of both nostrils, a protrusion from right nostril, and a swelling of right side of nose and adjacent cheek. History of three years. Tumor, removed by Annandale by an external incision, measured 6½ *inches in circumference.* Sections showed it to be a papilloma, consisting of a branching connective-tissue framework, containing blood-vessels, and covered everywhere with many layers of epithelial cells, distinctly demarcated from the stroma; here and there the epithelium showed evidence of invading the subjacent fibrous stroma. ARTHUR CHEATLE.

71. Griffin classifies the deflections into those of the superior, middle, and inferior meatus, and into cartilaginous deviations. In 250 successive nasal and throat cases he found 192 deflections, 133 in males and 59 in females; 86 toward the right and 78 toward the left side; 28 sigmoid, and 49 due to an injury. In 2 cases the deflections were found in children of five and six years respectively. Thirteen patients only complained of stenosis, and 27 of symptoms bearing directly upon the deflection; the remaining patients exhibited indirect symptoms. Deflections were most frequently found between the twentieth and thirtieth year of age with 73 cases, and next in frequency was the decade above with 42, and the ages below with 40 cases. The lower horizontal division was affected in 124 cases, the superior in 16 cases. The middle turbinate was impinged upon in 26; both inferior and middle in 29 cases; the superior meatus in 2 cases. For operation the saw and knife were preferred. M. TOEPLITZ.

72. Butts clearly describes the operation devised by Ash and depicts the instruments used. In cases of deflection with unsightly external deformity and outer twist of the nasal tip, he supplements the Ash operation by an incision with a bistoury along the length of the upper two fragments at their juncture with the nasal dorsum. In these cases only he places a small tube into the side opposite to the deflection. M. TOEPLITZ.

73. Anderson places into the long canula a flexible stilette with an eye for the reception of a double thread of piano wire at one end while the other end terminates in a circular hook, which is placed around a screw-post upon the upper finger ring.

M. TOEPLITZ.

74. Miller's patient was a boy, aged eighteen years, who,

while suffering from ozæna, suddenly became unconscious, and was convulsed for one hour. After a second fit he became blind. The sphenoidal sinus was opened by Grünwald's and Schäffer's method. The patient died after a third fit, becoming unconscious, with facial paralysis and divergent strabismus.

d.—FOREIGN BODIES IN THE NOSE.

75. McBRIDE, P. Case of foreign body (rhinolith) in nose. *Proceedings of the Laryngological Society of London*, Dec. 9, 1896.

76. HILL, WM. Case of rhinolith and rhinitis caseosa. *Proceedings of the Laryngological Society of London*, March 10, 1897.

77. FALKES, H. M. Worms in the nostrils. *Medical Record*, May 8, 1897.

78. ROTHENAICHER, Dr., Passau. Removal of a rhinolith which had formed around a cherry stone. *Monatschr. f. Ohrenheilk.*, No. 2, 1897.

79. HERZFELD, J., Berlin. On a rhinolith consisting of sulphide of iron, with remarks on the formation of sulphuretted hydrogen in the nose. *Monatschr. f. Ohrenheilk.*, No. 2, 1897.

75. A lady, aged thirty-two, came to McBRIDE, complaining of a discomfort in right nostril. On examination a whitish-brown mass with a sharp edge was seen, feeling hard to the probe. The mass pulled forward with a blunt hook, but its size necessitated breaking before extraction could be effected. The main mass measured 1½ x 1 x 1 inches, and was found to be a rhinolith. Something had been felt in nose for ten years. At eleven years of age, history of smelling nasal discharge. Bad breath all her life. The mass was slightly fœtid, but there was absence of all purulent secretion. ARTHUR CHEATLE.

76. HILL's patient, a female, aged forty-two years, had complained of right nasal obstruction, fœtor; headache, and deafness of the right ear. The cavity was filled with a putty-like mass; on removing this mass, the septum was found perforated, and the nasal antral wall and inferior turbinal were absent; the caseous matter extending into the antrum. The floor of the inferior meatus was occupied by a hard body, which was found to be a rhinolith. ARTHUR CHEATLE.

77. FOLKES removed from the right nostril of a negro, aged twenty-four, complaining of nose bleed and pains in the head, 78 live screw worms, as large as a pecan, with a forceps, and

after spraying with an alcoholic solution of chloroform, 53 dead ones; altogether 131, none under 10 millim. in length.

M. TOEPLITZ.

78. Removed with a probe curved like a hook.

KILLIAN.

79. The patient was stabbed with a knife at the inner angle of the eye ten years ago. The point of the blade broke and remained in the wound, which healed, without the patient knowing it. The subsequent suppuration in the nose produced H_2S, which, with the blade, formed sulphide of iron.

HERZFELD made experiments on the formation of H_2S in the nose by introducing a tampon of cotton infiltrated with acetate of lead. If there is pus, especially from the accessory cavities (not in genuine ozæna), the tampon turns black within a few hours.

KILLIAN.

e.—NEW FORMATIONS IN THE NOSE.

80. SILVER, D. R. Fibrous nasal polypus. *Jour. Amer. Med. Assoc.*, Feb. 20, 1897.

81. LONG, F. A. A large fibrous nasal polypus. *Jour. Amer. Med. Assoc.*, Jan. 16, 1897.

82. JONES, MACNAUGHTON. Esthiomenic menstrual ulcer of nose. *The Medical Press*, June 2, 1897.

83. MCNAMARA, J. Enuresis nocturna. Removal of nasal polypus. Recovery. *British Med. Jour.*, March 27, 1897.

84. LACK, H. LAMBERT. Nasal sarcoma. Cure after operation two years ago. *Proceedings of the Laryngological Society of London*, March 10, 1897.

80. A boy, twelve years old, presented a tumor in the naso-pharynx of the size of a man's thumb, extending below the soft palate. It was removed by means of a string of heavy double silver wire pulled through the nostril and mouth by means of thread carried through a small catheter. It had three lobes, was hard and fibrous, and measured $2\frac{3}{4}$ x $1\frac{1}{8}$ x $3\frac{1}{4}$ inches. From the point of attachment, which is not given, a large mucous polypus sprung up in a few weeks. M. TOEPLITZ.

81. A young, robust German-American farmer presented total nasal obstruction, with frog face. The left nostril contained a solid mass, which pressed the septum to the right and bulged the soft palate downward. The naso-pharynx was filled anteriorly

by a solid mass with uncertain attachment. When removed with polypus forceps through anterior nares, it was soft with slender pedicle, two-lobed, measuring 1¼ x 2¾ x ⅝ inches in the nasal, 1⅛ x ⅞ inches in the naso-pharyngeal lobe; the pedicle was ⅞ inch long, had probably originated from the sphenoid cavity, and occluded the right nasal cavity posteriorly. M. TOEPLITZ.

82. At a meeting of the British Laryngological, Rhinological, and Otological Association, held April 30, 1897, MACNAUGHTON JONES read the notes of a case in which an ulcer at one time involved the margin of the nose including the column, and the skin as far as the mucous membrane of the lip; there being marked exacerbations at every menstrual period. A cure, with very slight contraction, was obtained by removing sloughs, application of fuming nitric acid and solid nitrate of mercury, and later, zinc paste, with light applications of salactol to soften crusts, and a wash and cotton plug of solution of chinosal 1-600. Microscopical and bacteriological examination of portions of the tissue failed to elucidate the nature of the disease. ARTHUR CHEATLE.

83. A man having suffered from nocturnal incontinence for twenty years was cured a night or two after having a nasal polypus removed by MCNAMARA. ARTHUR CHEATLE.

84. The patient, a man, sixty-five years of age, was seen by LACK in April, 1895, when the right nostril was almost blocked by a soft, easily-bleeding, superficially necrotic mass, springing from the region of the middle turbinal. In May, 1895, the mass was thoroughly removed, the right ala nasi being detached to permit freer access. Now, nearly two years later, there is no sign of recurrence. Microscopical examination showed undoubted sarcoma. ARTHUR CHEATLE.

f.—AFFECTIONS OF THE ACCESSORY CAVITIES.

85. AVELLIS, Frankfurt a/M. The acute empyema of the antrum and its spontaneous recovery. *Arch. f. Laryng.*, iv., 2.

86. BRONNER, ADOLPH. Empyema of maxillary sinus. *British Med. Jour.*, Feb. 13, 1897.

87. WILKIN, G. C. A case of frontal sinus disease. *British Med. Jour.*, Feb. 13, 1897.

88. BOTEY. Treatment of chronic frontal sinusitis and consecutive intracranial lesions. *Revue hebdom. di laryng., d'otol.*, Nos. 3 and 4, 1897.

89. Tilley, H. Remarks on the operative treatment of a case of double frontal sinus empyema complicated by double antral suppuration. *British Med. Jour.*, Jan. 23, 1897.

90. Hajek, M. On the pathological changes of the ethmoidal bones following inflammatory hypertrophy of the mucous membrane and nasal polypi. *Arch. f. Laryng.*, iv., 3.

91. Mackenzie, John N. The pathological anatomy of ethmoid disease. *New York Med. Jour.*, Jan. 23, 1897.

92. Fraser. Purulent meningitis with cerebellar abscess. *Glasgow Pathological and Clinical Society*, Feb. 8, 1897.

93. Bond, J. W. Mucocele of left frontal sinus. *Proceedings of the Laryngological Society of London*, March 10, 1897.

94. Silcock, A. Quarry. Distension of mucus and empyema of the frontal sinus, with illustrative cases. *Practitioner*, March, 1897.

95. Bennett, F. W. Case of frontal sinus suppuration. *Proceedings of the Laryngological Society of London*, Feb. 10, 1897.

96. Spencer, W. G. Hypertrophic pharyngitis and tonsillitis, with chronic enlargement of parotids and submaxillary glands. *Proceedings of the Laryngological Society of London*, Feb. 10, 1897.

97. Tilley, Herbert. An investigation of the frontal sinuses in one hundred and twenty-six skulls from a surgical aspect, with cases illustrating methods of treatment of disease in this situation. *Lancet*, Sept. 26, 1896.

85. From the observations of ten acute empyemata of the maxillary antrum, Avellis reached the following conclusions:

1. Acute empyema of the maxillary sinus is a very frequent disease.

2. It occurs in a light and a severe form.

The *light* cases are characterized by a painful feeling of pressure and tension within the upper maxilla, purulent, sometimes sanguinolent, secretion, which does not appear in the regular type of chronic empyema. The pain increases in bending the head forward, in coughing, and pressing at stool. The secretion does not entirely cease during the night. Soft œdema, sometimes associated with erythema, of the cheeks and eyelids is frequent. Very rarely supraorbital pain. Generally no offensive odor, but sometimes.

The *severe* cases exhibit all symptoms of the light cases, with addition of pretty high fever, feeling of severe illness, abundant secretion, nausea, vomiting, aprosexia, and psychical alteration of the patients, who are not able to be out of bed.

3. Acute empyemata are likely to relapse. A common coryza may start a relapse.

4. Bilateral empyema is as frequent as monolateral.

5. Only in one out of ten cases it became chronic.

6. All the light cases recover spontaneously. Only when severe symptoms set in, and if not healed after three weeks, Avellis advocates opening and irrigation of the diseased antrum.

ZARNIKO.

86. BRONNER records a case in which parosmia was the only symptom of maxillary empyema. He draws attention to the frequency of the disease after influenza.

ARTHUR CHEATLE.

87. WILKIN'S patient had suffered with nasal discharge for five years. After polypi had been removed, pus was clearly seen to flow from the infundibulum. On trephining the sinus, three small mucous polypi were found imbedded in web-like granulation tissue. After thorough scraping a drainage-tube was inserted, and removed on the eighth day, when healing soon took place.

ARTHUR CHEATLE.

88. Three carefully observed cases. Case 1. Purulent discharge from left nostril for two years, empyema of the supramaxilla antrum, the anterior ethmoidal cells and the frontal sinus. Wide opening of the latter, with careful scraping of all recesses, tamponade through the anterior ethmoidal cells towards the nose; primary closure of the external wound. The tampon was removed on the eighth day, and aristol with boric acid insufflated. Complete and lasting cessation of the suppuration after six weeks.

Case 2 was less favorable, on account of meningeal symptoms existing before the operation. Both frontal sinuses filled with pus and granulations; perforation of the posterior wall of one of them towards the cranial cavity. Meninges and brain infected, probably from previous careless probing. The details of the interesting and long clinical history (fifteen pages) must be read in the original. Death after two and a half months. Tuberculosis could be excluded. BOTEY thinks that there was osteomyelitis due to bacillus pyogenes aureus. Autopsy not permitted.

In the third case, which, like the second, was not exactly chronic, there was a perforation of the posterior upper wall, which had led to a subdural abscess. Dura covered with granulations, softened and adherent to the brain. Cerebral punctures, after incision of the dura, did not reveal a further focus of suppuration. Tamponade; the wound left open. Second operation two months later, after the perforation in the wall of the frontal sinus towards the brain was closed by scar-tissue (the frontal sinus, however, still discharging). A wide opening was made in the middle nasal meatus, and the external wound closed according to Koenig's method of transplanting bone. Complete recovery after two months. ZIMMERMANN.

89. TILLEY'S case was that of a man, aged thirty-eight years, who suffered with constant purulent nasal discharge and polypi. At the age of eight years he received a blow on the forehead, followed by a discharge from the nose. At eighteen years of age he suffered with violent frontal headache and fever, a large abscess forming over the lower part of forehead. This abscess, after being opened, closed externally, but a purulent nasal discharge remained and continued. Granulation and polypi were present in the middle meatus on each side; these were removed. Both antra were opened and washed out, and the frontal sinuses opened in the middle line by a median incision put above the nose, freely scraped out, and drained through the nose. Recovery, wtih slight antral discharge. ARTHUR CHEATLE.

90. After describing necrosing ethmoiditis (Woakes), HAJEK reports histological investigations on changes of the ethmoidal bones in inflammations of their lining membranes. Normally there is an intimate connection between the mucous membrane and the medullary tissue of the bone. A net of bone with wide meshes, as it were, separates the two lamellæ of the mucous membrane, which form a continuous tissue with the meshes, *i. e.*, the medullary tissue within them. Thus it will be readily conceived that the bone always shows changes in deep-seated inflammations of the mucous membrane. The inflammatory infiltration reaches, by continuity, the medullary spaces which represent the interior lining of the bony lamellæ. The bone reacts either by new formation of bony substance or it decays, generally by both, so that the result is either increase or decrease of the bone substance. This is by no means to be termed ethmoiditis necrotica (Woakes).

The author thinks, differing from his former views, that necrosis of the nasal bones may occur without being due to lues or tuberculosis. ZARNIKO.

91. The diseased structures of the ethmoid removed after preliminary snaring off the anterior end of the middle turbinated body with cutting forceps and curettes, were microscopically examined by SIMON FLEXNER, and revealed that 1, the so-called myxomatous degeneration was due to simple inflammation; 2, purulent ethmoiditis does not necessarily produce osseous necrosis; 3, the changes described afford a field for the study of the development of nasal polypi; 4, the young granulation tissue resembles round-cell sarcoma. Suppuration is incidental and of secondary importance. M. TOEPLITZ.

92. FRASER'S case was a boy, aged twelve years, who died of meningitis and cerebellar abscess. The middle ears were normal. The nasal mucous membrane was found ulcerated. A foul nasal discharge had been noticed before death. ARTHUR CHEATLE.

93. BOND'S patient was a female, who had a swelling in the left frontal region for some years, with much pain on stooping forwards, and pain in left side of nose and left eye. There was tenderness on pressure, and some pitting and redness where the swelling was most prominent. History of a blow. On opening the sinus, thick mucus was found, and the nasal passage blocked. The passage having been made patent, the crown of bone removed by the trephine was replaced, and the wound stitched up. Complete cure without deformity. ARTHUR CHEATLE.

94. SILCOCK opens the floor of the sinus by means of an incision 1 inch in length below and under cover of the eyebrow. Care is taken to establish thorough drainage through the infundibulum. ARTHUR CHEATLE.

95. BENNETT showed a woman, aged thirty-nine, who, after influenza in the early part of 1894, suffered severely with right frontal pain and nasal discharge. In October, 1894, she came to the hospital, with an abscess the size of a walnut over the right frontal region, and a smaller one under the right eyebrow; a polypus was present in the right nostril, and the anterior end of the middle turbinal was considerably enlarged. The nose was cleared of the polypus and anterior end of the turbinal, and the bone was cautiously clipped away from the neighborhood of the infundibulum. After a few weeks the pus was so much diminished that an external operation was postponed, the patient doing so well under the use of a cleansing spray and occasional removal of granulation tissue. The openings in the bone on the exterior had become closed with new bony material.

ARTHUR CHEATLE.

96. **Spencer** showed a man, aged twenty-five years, who had had some superficial tubercular lesions and various acne patches and blepharitis. For some time after he had a febrile temperature without definite cause. For the last two months he had suffered with inflammation of the pharynx, tonsils, etc., and the parotids and submaxillary glands had become much enlarged and hard, but painless. ARTHUR CHEATLE.

97. As a result of his investigations, **Tilley** draws attention to the extreme variability of the sinuses; the almost invariable presence of a complete rupture; the prominence of the superciliary ridges being no guide as to the presence or extent of the sinuses beneath them; and to the variability of the depth of the infundibulum from the anterior surface, and of the direction and patency of the fronto-nasal passage. He discusses symptoms and treatment, advocating a median vertical incision. Three interesting cases are related. The paper is well worthy of careful study. ARTHUR CHEATLE.

g.—OTHER DISEASES OF THE NOSE.

98. **Thomas, Thelwall.** Saddle nose in which a celluloid bridge was permanently buried. *British Med. Jour*,. Feb. 6, 1897.

99. **Stewart, W. R. H.** Case of curious malformation of the nose. *British Med. Jour.*, Feb. 6, 1897.

100. **Lautmann.** Pathogenesis and serotherapy of ozæna atrophicans. *Ann. des mal de l'or., du lar.*, March, 1897.

101. **Kayser, Dr. R.**, Breslau. On the relation of ozæna to adenoid vegetations. *Wien. Klin. Rundschau*, No. 9, 1897.

102. **McBride, P.** A case of rapid destruction of the nose and face. *Proceedings of the Laryngological Society of London*, Dec. 9, 1897.

103. **Bennett, F. W.** Case of Leontiasis. *Proceedings of the Laryngological Society of London*, April 14, 1897.

98. A very ingenious piece of nasal surgery was shown by **Thelwall Thomas** at a meeting of the Liverpool Medical Institution, January 28, 1897. A patient, aged fifteen years, had lost the nasal bones in childhood from congenital syphilis. Through an incision made on the left side a piece of celluloid modelled like nasal bones, and possessing a well-marked keel on its concave surface, was inserted subcutaneously and pressed into position,

the keel fitting between the nasal processes of the superior maxillæ, the lateral portions resting on these processes. The celluloid had been in position for seven months, and did not appear to cause any irritation. The personal appearance of the patient was greatly improved. ARTHUR CHEATLE.

99. At a meeting of the North London Medical and Chirurgical Society, held on January 21, 1897, STEWART showed a man, aged twenty-three, on whom he had performed a plastic operation for a broad and deep groove in the middle line of the nose, running from the lower end of the nasal bones downwards between the lateral nasal cartilages. The organ thus presenting two well marked tips. Along the floor of the groove was a scar, due to the removal of a tumor (in all probability a dermoid) in infancy. At the operation the anterior margin of the septal cartilage was found abnormally broad. ARTHUR CHEATLE.

100. LAUTMANN considers ozæna as a trophoneurosis. The bacillus mucosus and the pseudo-diphtheria bacillus infest the mucous membrane secondarily when it is changed by inflammation. The injections of antidiphtheria serum helped in so far as they removed the offensive odors. ZIMMERMANN.

101. According to KAYSER, ozæna and adenoid vegetations exclude each other. The antagonism is due to constitutional causes. POLLAK.

102. A curious case related by MCBRIDE. A man, aged twenty-eight, scratched his nose on the inside of left ala with his finger in December, 1895. This became itchy and sore; in a week the skin began to swell. During January, 1896, the left side of nose and cheek became swollen and painful, and there was some discharge from the nostril. An ulcer was seen on the inner side of the left ala, about as large as a sixpence, covered with a dirty, white slough. Iodine given; but in March he was so much worse that he was taken into hospital. The case then presented the following features: an erysipelatous-looking swelling of the left ala, cheek, and lower eyelid, a pustule beginning to form on the exterior of left ala; much pus, partly inspissated, within the nostril, and bare bone in the region of the middle turbinal. The pustule gradually became a fistula, and from this gradual destruction of surrounding parts followed. Mercury inuncted without effect. Inoculation of guinea-pig by Milligan gave negative result, the animal presenting no evidence of disease when killed after five weeks. Destructive agents of various

kinds then employed, also without benefit. The temperature at first showed great rises, associated with marked œdema of face and eyelids, which at first lasted a few days and then disappeared. Towards the close of the case, the temperature more constantly up, but with marked fluctuations. In July, 1895, Dr. Unna saw the case, and suggested malignant tertiary syphilis or glanders. Bacteriological examination by Fortune showed numerous cocci and bacilli. The ulceration continuing in spite of everything, the patient died on September 18, 1896. Post-mortem—the destruction of the face found to be very extensive, the bone being exposed from *malar* to *malar*, while the whole external nose and most of the upper lip were destroyed. Sections from margins of the ulcer did not clear up the case. Marked endoarteritis was present, pointing to tertiary syphilis, but Muir was strongly of opinion that the disease did not correspond to any known type. The patient was a house painter by trade. No history of syphilis. Patient never had anything to do with horses.

ARTHUR CHEATLE.

103. A middle-aged man came to BENNETT on account of lachrymal obstruction on the left side. The nasal bones were much enlarged. The floor of the nose and the lateral wall much hypertrophied with bony thickenings. The condition had lasted for fifteen years. ARTHUR CHEATLE.

NASO-PHARYNX.

104. SCHWENDT, Dr. A. A case of congenital bilateral osseous atresia of the choanal. Healed by the galvano-cautery. *Monatschrift f. Ohrenheilk.*, No. 3, 1897.

105. BOENNINGHAUS, Dr., Breslau. Obstruction of the choanae through swelling of the folds of the tubal ostia. *Monatschr. f. Ohrenheilk.*, No. 3, 1897.

106. Exotosis of the pharyngeal vault accidentally removed together with adenoid vegetations. *Arch. internat. de laryng. d'otol.*, x., 1.

107. DE ROALDES, A. W. Fibro-chondroma of branchial origin (pharyngeal teratoma). *New York Med. Jour.*, Feb. 6, 1897.

108. SCHMIEGELOW, E., Copenhagen. A case of primary fatal hemorrhage after removal of adenoid vegetations. *Monatschr. f. Ohrenheilk.*, No. 3, 1897.

109. PLUDER and FISCHER. On primary latent tuberculosis of the hyperplastic pharyngeal tonsil. *Arch. f. Laryngol.*, iv., 3.

110. KUH, EDWIN J. Primary cancer of the naso-pharynx cured by injections of alcohol. *Med. Record*, April 17, 1897.

111. CONÇANON, JAMES T. On retronasal adenoids and their removal with a new instrument. *New York Med. Jour.*, June, 12, 1897.

104. Both nasal cavities had the shape of a funnel with the apex at the floor of the lower meatus. All turbinated bodies were atrophied. The probe felt a bony resistance behind. Vault of the palate very high, its osseous portion unusually short. The atresia was in the choanae. Treated with galvano-cautery in several sittings; afterwards introduction of canula of silver by the patient herself. The inclination to return was great. Sense of smell abolished at first, even after the operation; recurred later on. KILLIAN.

105. BOENNINGHAUS observed in this remarkable case how the mucous membrane surrounding the tubal orifices swelled, forming two smooth, red tumors, which almost closed the naso-pharynx, the choanae and touched each other in the median line. Application of cocaine caused a decrease of the swelling, so that free nasal breathing was possible. The tumors were destroyed with the galvano-cautery. Apparently the mucous membrane of the tubes consisted of cavernous tissue, like the lower turbinated bodies. KILLIAN.

106. In a girl, aged eleven, adenoid vegetations, during removal with the pharyngo-tonsillotome of Schuetz, offered a considerable resistance, so that the instrument was bent (with crepitation). This was due to a triangular piece of bone, which came away with the vegetations, and was 1 *cm* long, ½ *cm* wide. It consisted of spongy bone, no cartilage or fibrous tissue, and was taken by LICHTWITZ for an exostosis of the tuberculum pharyngeum. Lichtwitz observes briefly the observations of Zuckerkandl, Scheff, Helme, and Roth in regard to this subject. ZIMMERMANN.

107. The tumor was observed, in a boy, six weeks old, to emerge in crying from the naso-pharyngeal cavity, to fall gradually down as far as the vestibule of the larynx, then, after coughing, to recede to the naso-pharynx or to place itself on the dorsum of the tongue, and finally, by rotating around its attachment upon the left side of the bucco-pharyngeal cavity, to reach the alveolar

border of the superior maxilla. The naso-pharynx was comparatively free. After its evulsion with the pedicle, which was implanted to the middle part of the posterior pillar, it presented the appearance of an auricle (1 x 1½ inch), covered with epidermis, corium, cartilage, etc. According to ACHARD's examination in Lannelongue's laboratory, it was made up of connective tissue and some adipose tissue. The cartilage is reticulated, or elastic fibrous. The tumor approaches the branchial fibro-chondromata in the buccal cavity, with the distinction that the integument is cutaneous instead of mucous, and it is a simple expression of an "epignath monster." J. Bland Sutton considers it a dermoid tumor, or teratoma of the pharynx; the shape is accidental.

M. TOEPLITZ.

108. By faulty and apparently forcible application of Gottstein's annular knife, the lateral wall of the naso-pharynx was lacerated, and also, in a manner scarcely to be explained, the internal carotid were injured before its entrance into the carotid canal of the petrous bone, leading to a directly fatal hemorrhage. The patient was a boy of twelve years, who did not resist during the operation. The operator had performed the same operation several times previously, as SCHMIEGELOW states.

KILLIAN.

109. At the instance of the communications of Lermoyez and Dienlafoy, PLUDER and FISCHER examined thirty-two pharyngeal tonsils in regard to tubercular affections. They found in five more or less numerous typical, partly cheesy tubercles, which contained bacilli only in the lymphatic glandular tissue. No ulceration. Bacilli were never found in the nasal mucus. The diagnosis could be made only from microscopic sections. The diseased parts did not present any microscopic peculiarities.

The tubercular pieces belonged to individuals aged from three to twenty-six years, of whom only few gave a family history of tuberculosis, more presented the aspect of marked scrofula. The authors are convinced that the infection was brought about by inhalation, and believe that in many cases the affection remains localized, but becomes rather serious on account of the imminent danger of spreading (by inspiration, by the lymphatics and the blood-vessels).

Therefore they advise radical removal of the adenoid vegetations by skilful hands. The clinical remarks are by Pluder, the histological by Fischer.

ZARNIKO.

110. KUH's patient, aged thirty-seven, suffered, apart from an old atrophic rhinitis, from gradually increasing obstructions of the left nostril and from epistaxis. The naso-pharynx was occluded by a tumor, growing from the vault, which was softer on the right, and globular and hard on the left side. Owing to the diagnosis of the enlarged pharyngeal tonsils the growth was removed, but returned within a month. Microscopically, an epithelial cancer was found, which was confirmed by Nicholas Leun. Injections with erysipelas-prodigiosus toxines (Coley) at first decreased, but after fourteen injections increased the growth. Injections with absolute alcohol, according to C. Schwalbe and O. Hasse, beginning with 3 and increasing to 30 minims, reduced the tumor after the seventh, and after the nineteenth injection the naso-pharynx was in four months found to be entirely free.

M. TOEPLITZ.

111. A thin plate of spring steel with rounded edges, bent at right angles, is attached to the lock of the forceps, reaching to the tip and covering the open jaws. Its vertical part has a depression, which fits over the septum, protecting the latter against the open blades. The latter are fenestrated, and cutting as in the Gradle forceps, CONCANON claims that this instrument may remove the adenoids, particularly those near the septum, with one application under cocaine. M. TOEPLITZ.

VELUM, PHARYNX, AND ORAL CAVITY.

112. HAJEK, Dr. M., Vienna. Operation for adhesions between the soft palate and the posterior wall of the pharynx. Preservation of the artificial communication. *Allgem. Wien. medic. Zeitung.*, No. 1, 1897.

113. LOGUCKI, A., Warschau. A contribution to the etiology of the peritonsillar abscess. *Arch. f. Laryng.*, iv., 2.

114. SEMON, FELIX. Case of black tongue. *Proceedings of the Laryngological Society of London*, Jan. 13, 1897.

115. BENNETT, H. W. Case of tumor of the uvula. *Proceedings of the Laryngological Society of London*, Feb. 10, 1897.

116. BOND, J. W. Case of thickening of hard palate. *Proceedings of the Laryngological Society of London*, Dec. 9, 1896.

117. MCBRIDE, P. Pulsating vessels in the pharynx. *Edinburgh Med. Jour.*, Dec., 1896.

118. NEWCOMB, JAMES E. Anatomical defects in the faucial pillars. *The Laryngoscope*, April, 1897.

112. Methodical dilatation of the stricture with an instrument similar to the nasal speculum of B. Fraenkel. Linear adhesions of the soft palate are detached in one sitting, adhesions of the whole surfaces in several sittings. POLLAK.

113. From eleven cases of peritonsillar abscess examined bacteriologically and a number of clinical observations, LOGUCKI reached the following conclusions: Peritonsillar abscess is a secondary affection, generally after recurrent acute tonsillitis, sometimes after diphtheria. Adhesions between the tonsil and the faucial pillars give a predisposition to it. If the abscess is opened in the first few days, chiefly streptococci are found, later also staphylococci, finally staphylococci alone. Probably the staphylococci exceed the streptococci, and contribute to a favorable issue of the affection by replacing them. ZARNIKO.

114. SEMON showed a patient, aged forty, who had had a large patch of enormously elongated hairy-like, inky-black papillæ in the region of the papillæ circumvallatæ. Great improvement had occurred under the local use of a five-per. cent. ethereal solution of salicylic acid, mixed with a five-per cent. collodion solution, and followed by an application of peroxide of hydrogen by means of a plug of cotton wool, applied several times a day; a plan of treatment recommended by Dana. ARTHUR CHEATLE.

115. BENNETT showed a simple tumor, the size of a walnut, removed from a child aged six years. It appeared to be confined to the uvula, but digital examination showed that it extended upwards towards the hard palate. The tumor interfered with distinct speech. It was removed by dividing the mucous membrane, and shelling it out except for the strands of tissue which passed up. The exact point of origin could not be determined.

ARTHUR CHEATLE.

116. BOND showed a girl, aged twenty-eight years, who had noticed a swelling at the junction of hard and soft palates and in the middle line for nine months, and which ached "like toothache." Consisted of three wounded divisions, paler on the surface than the surrounding mucous membrane, and tender to the touch. Probably an exostosis. ARTHUR CHEATLE.

117. MCBRIDE records two cases of abnormal arteries running up on each side behind the posterior faucial pillars, a large trunk passing across the posterior pharyngeal wall in one of them.

ARTHUR CHEATLE.

118. Newcomb divides the anatomical defects into two classes: one, due to destructive processes, and the other of congenital origin. He collects forty-two cases, including three of his own observation, of which thirty-one only were fully reported. Of these, 25 exhibited defects in one or both anterior pillars, and 6 in one or both posteriors; 13 were anterior bilateral, and 1 posterior bilateral. He then discusses the symptomatology, as much as these cases present, and the mode of origin, referring extensively to the paper on the same subject, published by the reviewer, in these Archives, vol. xxi., No. 1. M. Toeplitz.

REPORT OF THE PROCEEDINGS OF THE SECTION IN LARYNGOLOGY AND OTOLOGY OF THE SIXTY-FIFTH ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION, AT MONTREAL, SEPTEMBER 1-4, 1897.

By Dr. J. A. SPALDING, Portland, Me.

The opening meeting of this Section was devoted to papers on **Turbinotomy,** by Dr. MacDonald. The main drift of the paper and of the subsequent discussion tending to show that the operation has been overdone on both sides of the Atlantic, and that, except in rare cases, better results can be obtained by milder and particularly less destructive methods of treatment. The complete removal of the inferior turbinates is not practised to the same extent in America as by some distinguished colleagues in England.

Dr. Bryson, of Washington read notes on **The Anatomy of the Fronto-Ethmoidal Region,** containing most valuable results of observations on the anatomy of the infundibulum, which cannot fail to be of interest and value to surgeons operating in that region.

Dr. Fletcher Ingalls introduced the topic of **The Relation of Nasal Diseases to Pulmonary Tuberculosis,** in which he suggested that there was to some degree an antagonism between pulmonary tuberculosis and nasal catarrh. The paper was a valuable contribution to statistical investigation of the question, but the results were not entirely accepted by some of those who discussed the paper.

The second day was occupied with the reading of papers chiefly on **Laryngeal Paralysis,** beginning with one by Dr. Daly, who dealt especially with the ætiology of the same. Dr. Shurly spoke further on the prognosis of such cases, and thought that structural lesions would be found more often in cases of hysterical paralysis if looked for more carefully and often.

Mr. LENNOX BROWNE spoke about **Hysterical Aphonia**, and the use of the voice in singing.

Dr. BRYSON DELEVAN pointed out the need of further investigations into **Right-Sided Laryngeal Paralysis**, and referred to two unusually persistent cases of diphtheritic paralysis. One case had lasted for three years, and the other for sixteen, with no return of the vocal powers.

Dr. PERMEWEN, of Liverpool, referred to certain observations on the **Condition of the Larynx in General Paralysis of the Insane.** In this condition laryngeal paralysis was very common, that is, abductor or whole-cord paralysis. He held that a very constant diagnostic sign of hysterical paralysis was the absence of all abductor paralysis, and concluded by relating a case of bilateral abductor paralysis due to the pressure upon both recurrent nerves through the action of an aneurism.

Dr. MACKENZIE'S paper discussed **The Physiological and Pathological Relations between the Nose and Sexual Apparatus**, and later it was briefly discussed by some of the members.

Dr. ROE, of Rochester, spoke on **The Correction of Nasal Deformities by Subcutaneous Operations**, which contained many valuable and instructive points; and Dr. BRYSON finished the session with a paper on **The Surgical Treatment of Malignant Diseases of the Larynx**, showing many practical points, and urging the necessity of early and radical measures.

BOOK REVIEWS.

The Operative Exposure of the Middle-Ear Spaces after Detachment of the Auricle, as a Radical Procedure to Cure Old, Chronic, Middle-Ear Suppurations, Caries, Necrosis, and Cholesteatoma of the Temporal Bone.

By Dr. L. STACKE, Erfurt. Published by F. Pietzker, Tübingen, 1897.

Reviewed by Dr. A. HARTMANN, Berlin.

Translated by Dr. ARNOLD H. KNAPP, New York.

This book gives an exhaustive description of the author's radical cure for chronic middle-ear suppuration. Though perhaps one-sided, as only this one method (Stacke's) is discussed, it is nevertheless interesting to read the very accurate manner of procedure, especially for those familiar with the remaining literature on the radical operation.

In the introduction Stacke reiterates his claim to priority in the invention of the radical operation. He deems this necessary, in view of the repeated claims of priority expressed by Zaufal. The zealous attempts of Stacke to assure his priority seem to show that his claims, as far as they concern the radical operation in general, are not too well founded. The method which commences in the attic after detachment of the auricle and ends in the antrum belongs unquestionably to Stacke, but the method of chiselling from the outer side of the mastoid, and after exposure of antrum, laying the latter and the attic bare was recommended and performed before Stacke. The reviewer begs to draw attention to his former papers on this subject in these ARCHIVES.[1]

Stacke's attempt to establish his priority by quoting several witnesses on the date of the first operations is unsuccessful. It is customary in science to claim priority from the date of the publication.

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[1] "Historical Remarks on the Exposure of the Attic, the Tympanum, and the Mastoid Antrum." These Archives, vol. xxiv., p. 1.

The reviewer takes it for granted that the majority of otologists do not employ Stacke's method of first entering the attic and then the antrum, but remove the cortex and the posterior wall of the auditory canal to the antrum and then expose the attic. Stacke's method would then be indicated only when, starting from mastoid process, one could not find the antrum. As this is unusually seldom, this procedure would only rarely be employed.

The nasal operation commencing externally is simpler and just as safe as that of Stacke. It is quite true that at the commencement of radical operations the facial nerve was injured a number of times. This can be explained by the insufficient regard for certain anatomical relations, and by the directions of Küster and Zaufal to remove the posterior wall up to the tympanum. The reviewer has often pointed out that the posterior wall should not be completely removed, *i. e.*, including the inner edge, as has been shown by his drawings, the facial canal then could not be excluded. The reviewer has always insisted that the antrum must first be exposed, and then the anterior lower wall of the same, and the outer wall of the attic should be removed. In this method the facial canal is not injured, and in the present radical operations this accident no longer appears.

In regard to cholesteatoma, Stacke agrees with Zaufal that the entire lining wall of the cavity must be removed to insure safety against recurrence. This opinion will not be shared by all otologists. Siebenmann has shown that a cure may take place without this precaution. The reviewer also has observed several cases where the simple radical operation had been performed and no recurrence took place. The complete removal of the lining wall explains the protracted period of after-treatment, notwithstanding the aid of plastic operations. Stacke specially mentions a case where, after an extensive chiselling operation without removal of the lining wall, recurrences repeatedly took place, and a second operation had to be performed to remove the cholesteatomatous membrane and a layer of bone and secure a covering by plastic. Stacke is, however, not able to report the permanent cure; the case only seems to him to be healed. A number of observations are necessary to decide this point. The retro-auricular opening need not be permanent in cases where the lining wall has been preserved, as the permanent exposure of very extensive cavities can be obtained with aid of Körner's flap.

The first step in Stacke's method is the curved incision behind the auricle and the lifting out of the membranous canal according to the manner previously described by him, *i. e.*, the division of the auditory canal as far inward as possible, and the retraction of the canal with aid of a raspatory. The second part of the operation consists in the exposure of the middle-ear spaces. The hammer, if still present, is first removed; then, differing from the other radical operations, the pars epitympanica and the posterior upper wall of the canal is removed until the probe can readily be introduced into the antrum. Then follows the removal of the outer corticalis and the outer part of posterior wall.

The third step is the formation of flaps to cover the osseous defect. Stacke forms a flap by a horizontal incision which divides the upper wall parallel to the axis of the canal, and extends to the concha and a second incision which passes directly up from the outer extremity of the latter. The flaps are pressed against the bony surfaces with tampons. Stacke mentions Panse's flap, which is taken from the posterior wall and is quadrilateral in shape. He considers the only advantage of this flap to be the primary closure of the retro-auricular opening, but doubts with justice whether it be an advantage to conduct the after-treatment through the auditory canal in this case. Stacke does not seem to have tried Körner's flaps. The latter differ principally from Panse's in that the four-cornered flap is partly formed from the concha. In this case it is possibly to close the posterior wound, and the canal is so wide that the after-treatment can take place easily. Körner's flaps have so shortened the healing process and simplified the after-treatment, that after their employment no one would return to keeping open the retro-auricular wound and making use of the Stacke or Panse flap. The theoretical objections which Stacke advances against Körner's flaps, namely disfigurement and difficulty in controlling the granulating process need not be considered in comparison to their advantages.

The after-treatment is the same as after any radical operation. Stacke lays especial weight on the packing of the wound first with small, then with larger strips of gauze. The strictest aseptic precautions are to be observed during the dressings. To control the granulations silver nitrate or the galvano-cautery are employed. The reviewer considers chromic acid to be superior to either of these, on account of the painlessness, the facility of application, and the definite action.

The prognosis of the radical operation is a very favorable one, and the operation may be regarded as without danger. Of Stacke's 100 operated cases, 96 were healed, 3 have died, 2 unfinished, and 1 not improved. The hearing was not impaired in 49 cases, improved in 31, made worse in 6, and no examination was made in 14.

The average course of treatment in the 100 cases was three and one half months.

As far as it was possible for Stacke to learn, recurrence took place in the 100 cases 20 times, namely: 12 recurrences in the skin (superficial discharges), 4 in the bone, 4 on account of general malnutrition. These recurrences were all healed.

In the second part of the book the histories of the 100 cases are briefly detailed.

ERRATUM.

A serviceable solution of dog-pepsin for injection and the syringe mentioned in Dr. Cohen Kysper's article on the "Treatment of Deafness, etc., by Digestive Ferments," page 158 of this volume, may be obtained from the physiological institute of Dr. Carl Enoch, in Hamburg.

Contents of the latest numbers of the Zeitsch. für Ohren.

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1. On cartilaginous interglobular spaces in the human labyrinthine capsule. By Dr. P. Manasse.

2. Studies on the form of the ear. By Dr. Karutz. IV. The form of the ear as a sign of degeneration.

3. Dr. Harris's paper.

4. The determination of one-sided deafness. Six further cases of labyrinthine necrosis. By Professor Bezold.

5. Affections of the ear in leukæmia. By Dr. Schwabach. Report on the progress in Otology during the first quarter of 1897 (concluded). By Dr. Hartmann.

Report on the sixth meeting of the German Otological Society in Dresden, on June 4 and 5, 1897. By Dr. Jens.

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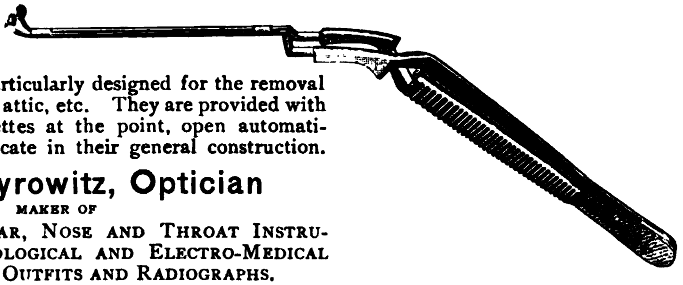

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